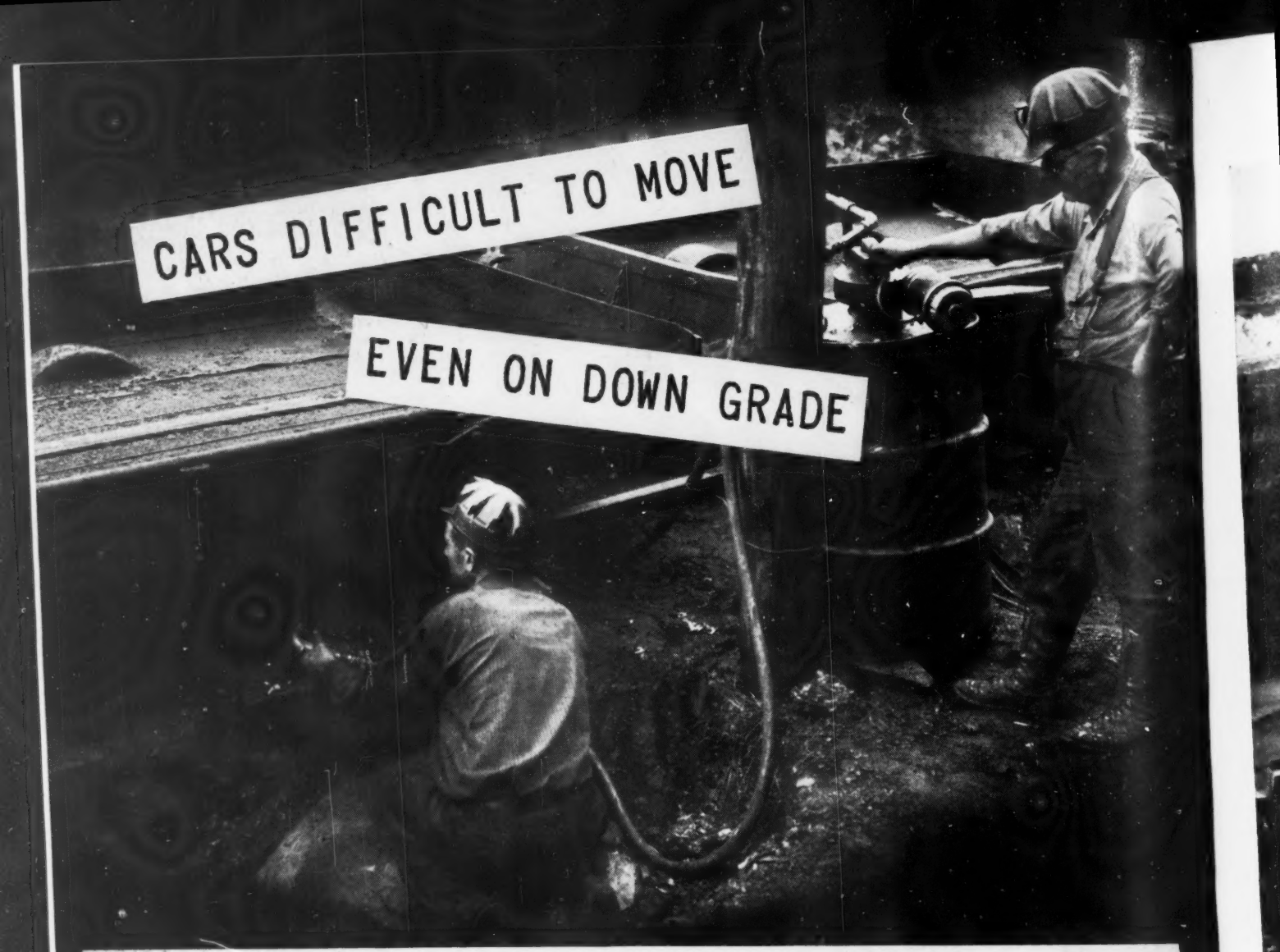
Coal Age

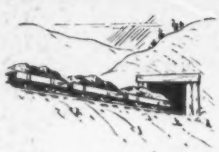
FEB 1945
DETROIT

JANUARY, 1945

COAL STABILIZATION

SEE PAGE 66





SUN MINE LUBRICANTS

The Answer to this Operator's Problem

A West Virginia coal and coke company greased its mine cars regularly, with a competitive lubricant, but it was difficult to make them roll, even down a 15% grade. The grease was separating, forming a hard, soapy cake in the Timken bearings.

With the help of a Sun Oil engineer, the maintenance crew cleaned out the bearings, substituted Sun No. 300 Mine Car Grease. After that — on any kind of an incline — every car rolled like new.

FIFTEEN MONTHS LATER the management reported: 1. They had had no further difficulty with grease separating. Results for mine car lubrication were running 15% lower than ever before.

Perhaps your equipment is not getting the attention it needs today because of manpower shortages and constant work. Perhaps you are up against a particularly tough lubricating problem.

Sun makes a complete line of quality oils and greases for cars, engines, loaders, compressors, blowers, diesels, lifts, hoists, conveyors, motors, etc.

A Sun Engineer, who knows coal mining from seam to tipple, and who knows lubrication, lives near you. He'll be glad to call at your convenience.

SUN OIL COMPANY • *Philadelphia 3, Pa.*

Sponsors of the Sunoco News Voice of the Air — Lowell Thomas

SUNOCO

SUN INDUSTRIAL PRODUCTS

OILS FOR AMERICAN INDUSTRY

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FEB 1 1945
DETROIT

In war or peace
B.F.Goodrich
FIRST IN RUBBER

1900-foot rubber band snaps iron through a mountain

A typical example of B. F. Goodrich development in rubber

WAR DEMAND for iron ore last year was so great that companies searched out even the "worked over" mines. The one in the picture had some ore — but at the bottom of a pit.

The way to get it out was by conveyor belt, but that would be the highest single lift of any belt in the world and conventional belts that were strong enough would be too stiff to trough and carry heavy ore up the mountain side. So three belts were used, each for a third the distance, but even they wore out fast and transfer points required much attention.

An engineer at this mine had heard of B. F. Goodrich cord conveyor belt. Made of parallel cords in rubber instead of woven fabric, it is many times as strong and still as flexible as any former belt. Extraordinary records made by this new B. F. Goodrich belt on other "impossible" jobs convinced the engineer it would stand the strain on this one.

The belt was installed, at a 35% grade — almost a rubber elevator. The shaft went through the mountain itself, from pit to railroad cars on the surface — a 1000-foot run.

The B. F. Goodrich cord belt "troughed" perfectly, eliminated two transfer points and reduced maintenance cost. It has already hauled 800,000 tons of vital iron ore, and the owners say it is good for at least 1,250,000 tons the first year and thousands more the next. Jobs like this, that have looked impossible, are being done every day by B. F. Goodrich industrial rubber products—the developments of constant research. That's why it pays to find out what improvements B. F. Goodrich has made in any rubber product you use. *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F. Goodrich
RUBBER *and* SYNTHETIC *products*

ONE THING DONE *supremely* WELL

The great Italian painter, Giotto Di Bondone, born in Florence, Italy, in 1266, won a competition for skill, not by any elaborate work of art, but simply by drawing a perfect circle — free-hand!

The name Hulburt gained its reputation in the same simple way. Hulburt identifies one perfect product made for one special use — Hulburt Quality Grease, for coal mine lubrication.

HULBURT OIL & GREASE COMPANY . . PHILADELPHIA, PENNA.

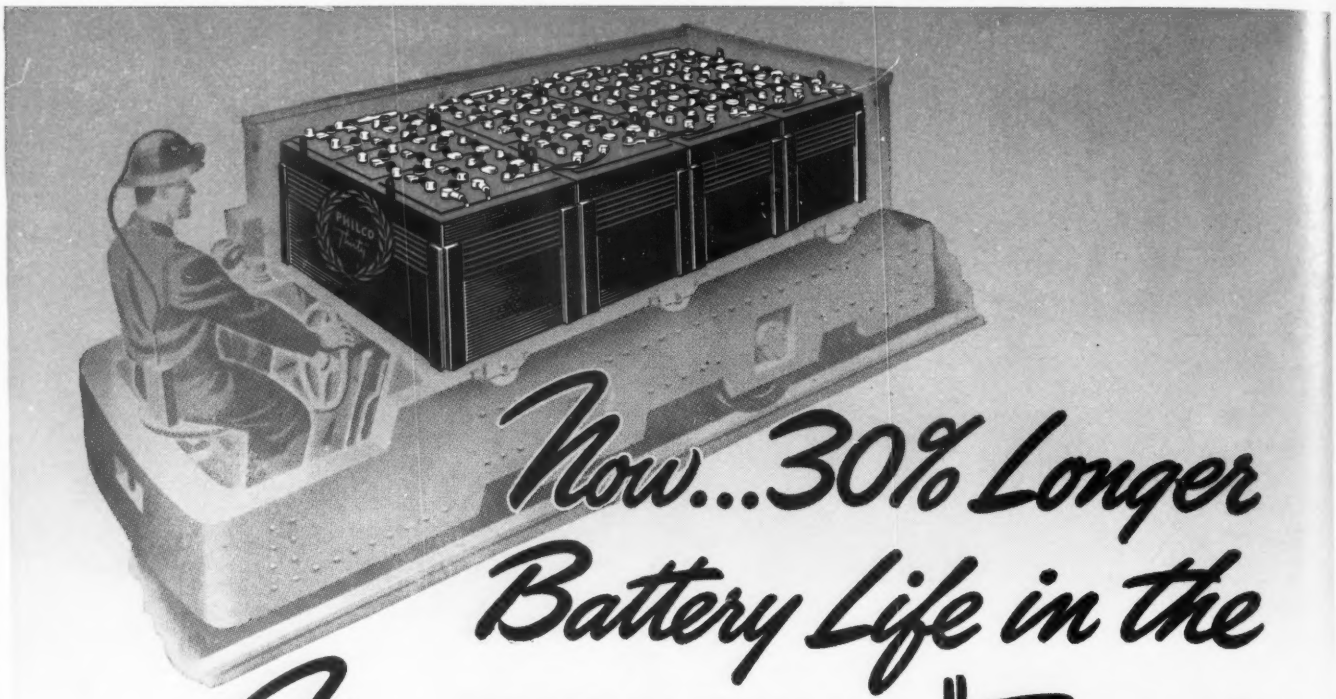
Specialists in Coal Mine Lubrication

HULBURT

Quality GREASE

ONE THING

done supremely well!



Now...30% Longer Battery Life in the New PHILCO "Thirty"

Post-War Planners—Please Note

Be sure to include the new Philco "Thirty" when considering all future purchases of mine locomotive and shuttlecar batteries. In the years ahead, this revolutionary new long-life construction, with FABRICATED INSULATION*, developed by Philco Research, will save you dollars in depreciation, up-keep and replacement costs. It's your post-war battery—available now in certain types and limited quantities. Write today for complete information.

**Patent applied for.*

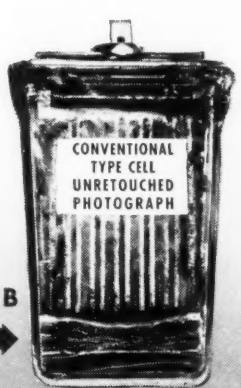
PHILCO CORPORATION
Storage Battery Division, Trenton 7, N. J.

A

Note absence of sediment

UNRETOUCHED PHOTOGRAPHS

of Philco "Thirty" (A) and Conventional Type (B) cells at conclusion of accelerated life test, in motive power cycle service, charged and discharged in series, in the same circuit. Note sediment space; Philco "Thirty" is clear; Conventional cell is filled.



B

Note sediment

For Fifty Years a Leader in Mine Storage Battery Development

Coal Age

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To .....

SIGNED .....

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The exclusive Walter Four Point Positive Drive provides far greater power and traction than conventional four wheel drives. Automatic Locking Differentials proportion the power smoothly to the FOUR DRIVING WHEELS according to the traction of each wheel at any instant, preventing wheel spinning and slipping that stalls trucks and damages roads.

No other truck can match the Walter Tractor Truck in strip mine hauling because no other truck combines features like the 300 H.P. motor, Suspended Double Reduction Drive, the Tractor Type Transmission, the Cab Forward Design with its short wheelbase and scientifically distributed weight. Learn how to cut hauling costs. Write for the complete story today.

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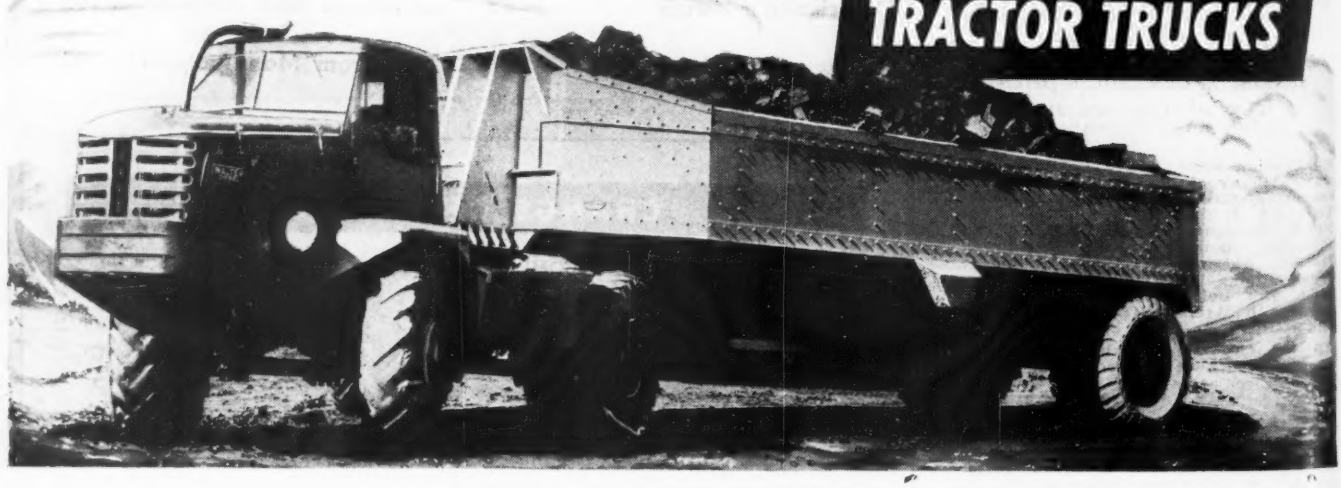
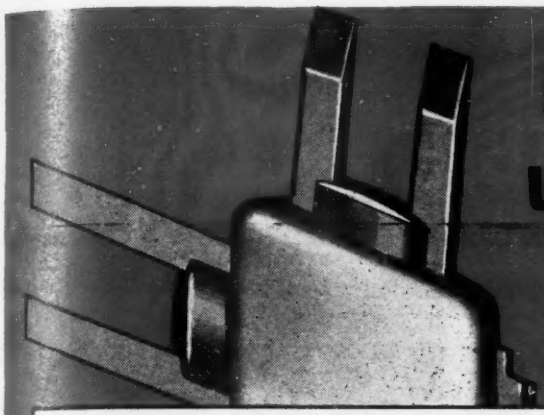




BETTER DRILLING *Begins* WITH COALMASTER BITS

No drill is better than its bit. It pays to standardize on Coalmaster Drill Bits—scientifically designed to cut cleaner, faster, and last longer.

They are stocked in a wide variety of lengths and cross sections—single or double edge—chisel or diamond point—medium or hard temper—borium tipped or plain, for every drilling operation.

Cross section and length in Columns 1 and 2, the bit number in 3. Reading across 4 to 9, you can readily see characteristics of each bit.

1 2 SIZE		3 BIT	4 5 EDGE		6 7 POINT		8 9 TEMPER	
Cross Sec.	Length	Number	Single	Double	Chisel	Diamond	Medium	Hard
¼ x ¼	2 1/16	60	x		x		x	
		56		x	x			x
		57		x	x		x	
¼ x ¼	2 1/8	54	x		x			x
		54F	x		x			x
¼ x ¼	2 ¼	53	x		x			x
		62	x		x		x	
		51		x	x			x
		63		x	x			x
		64		x	x		x	
		50H	x			x		x
		50	x			x	x	
¼ x ¼	2 ½	52	x		x			x
		55		x	x			x
		49	x			x	x	
¼ x 5/16	2	43	x		x			x
		43F	x		x			x
¼ x 5/16	2 ¼	42		x	x			x
		46	x		x			x
¼ x 5/16	2 3/8	44		x	x			x
		47	x		x			x
		47F	x		x			x
¼ x 5/16	2 5/8	45		x	x			x
5/16 x 5/16	2 ¼	85	x					x
		91		x				x
5/16 x 5/16	2 3/8	81		x				x
		86	x		x			x
5/16 x 5/16	2 ½	76		x	x			x
		87	x		x			x
5/16 x 5/16	2 5/8	82		x	x			x
		88	x		x			x
5/16 x 5/16	2 ¾	83		x	x			x
		89	x		x			x
5/16 x 5/16	3	84		x	x			x
		90	x		x			x
3/8 x 3/8	2 5/8	69	x		x			x
		69FB	x		x			x
3/8 x 3/8	2 ¾	66		x	x			x
3/8 x 3/8	3	58		x	x			x
		70	x		x			x
3/8 x 3/8	3 ¼	67	x		x			x
		67F	x		x			x
3/8 x 3/8	3 ½	68		x	x			x
½ x ½	2 ½	71	x		x			x
½ x ½	2 ¾	72P	x		x			x
		72F	x		x			x
		75	x		x			x
½ x ½	3	73		x	x			x
		74	x		x			x
		78	x			x		
½ x ½	3 ¼	77	x			x		x

TABLE FOR SELECTION OF COALMASTER DRILL BITS

- *Please Order by Number for Immediate Shipment*

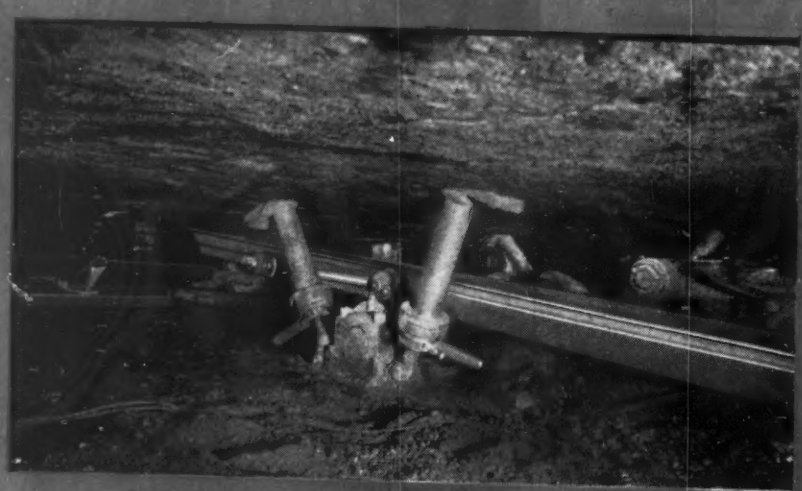
Information on special bits for all purposes furnished on request

DRILLING COALMASTER TOOLS

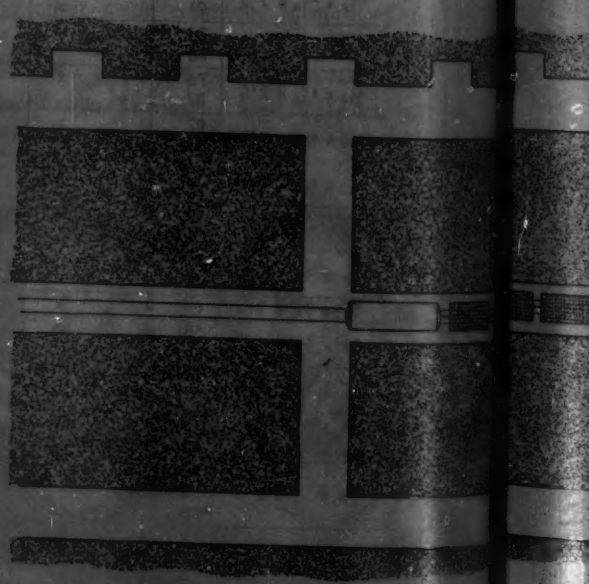
CENTRAL MINE EQUIPMENT CO.
ST. LOUIS 8, MO.

The GOODMAN DUCKBILL-SHAKER

With the automatic Duckbill, there are no rapidly moving parts or heavy dumping to break large lumps. 14344



The shaker line may be operated at the side of the drive unit for proper clearance in low seams. 12139

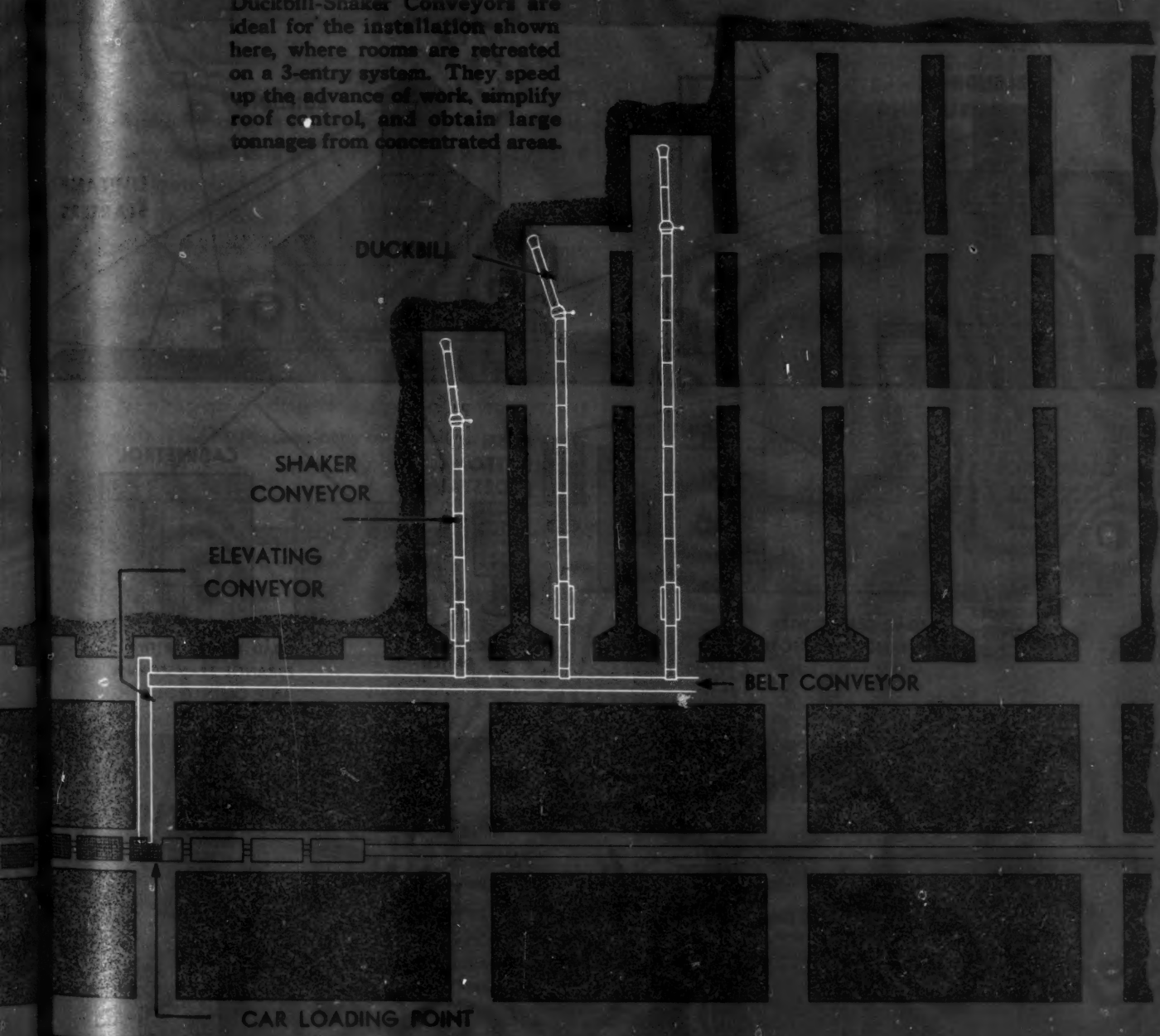


GOODMAN MANUFACTURING COMPANY

CONVEYOR SYSTEM OF MINING

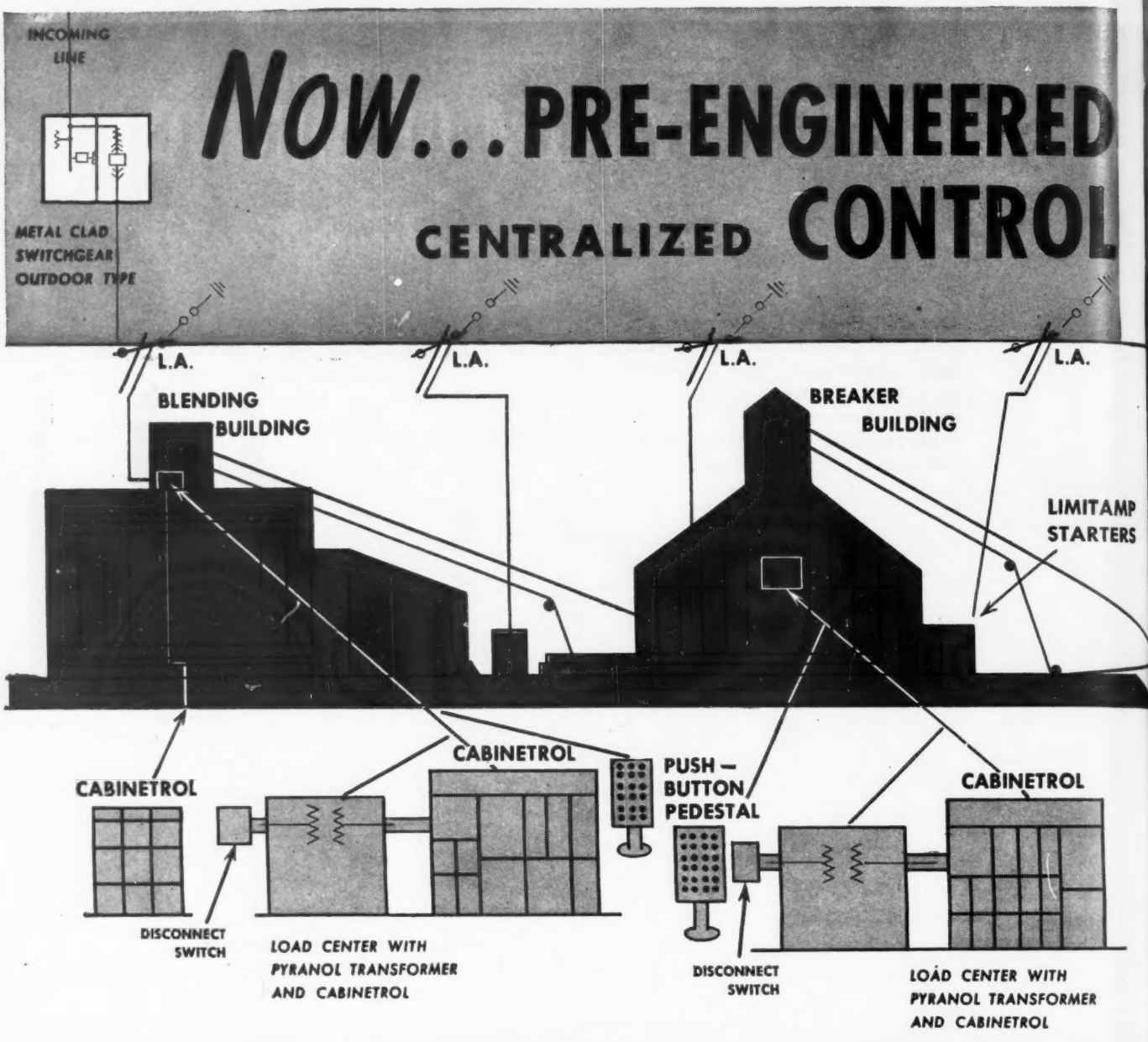
A Continuous Flow of Coal from Face to Mine Car

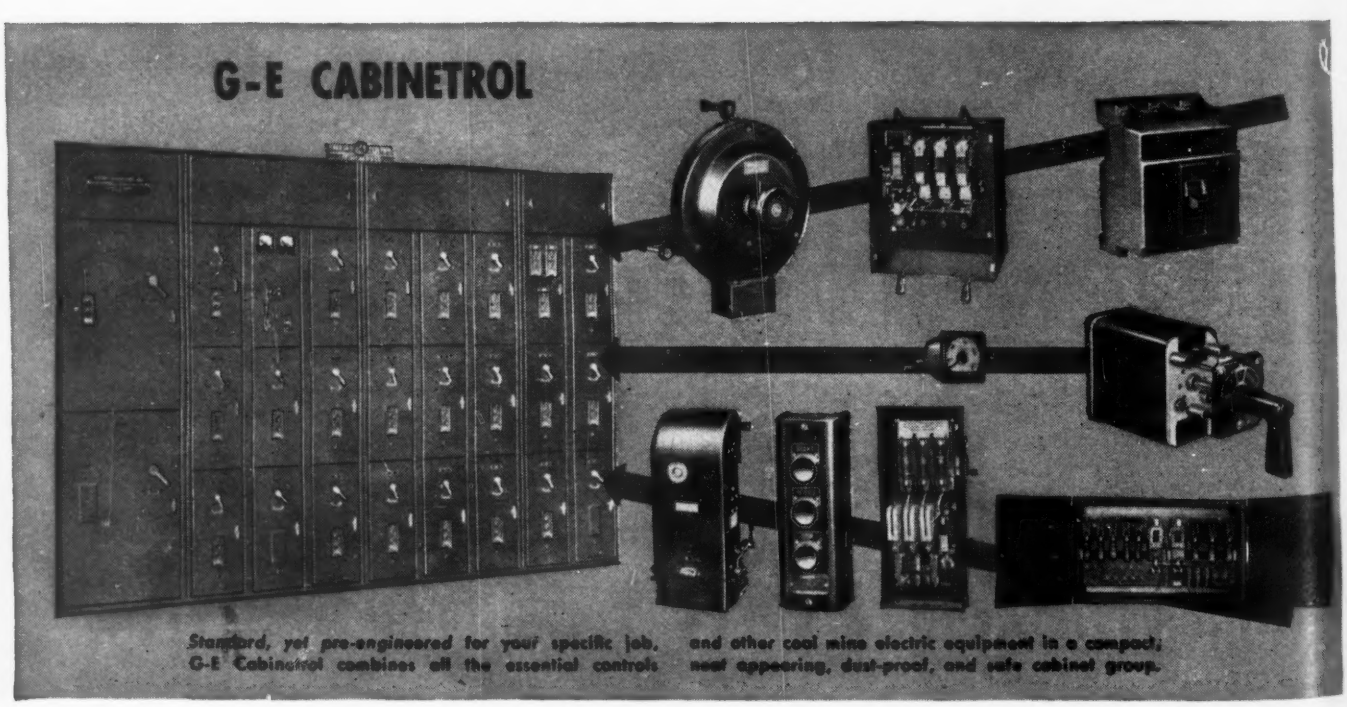
Ducktbill-Shaker Conveyors are ideal for the installation shown here, where rooms are retreated on a 3-entry system. They speed up the advance of work, simplify roof control, and obtain large tonnages from concentrated areas.



Shaker conveyors are in profitable service in a great variety of mining conditions. Ask a Goodman sales engineer for the plan most beneficial for your requirements.

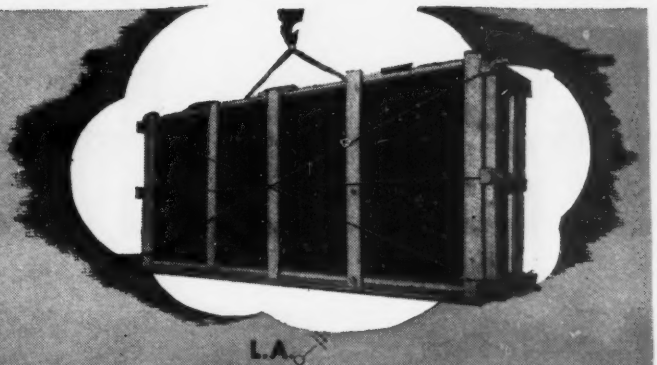
HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS

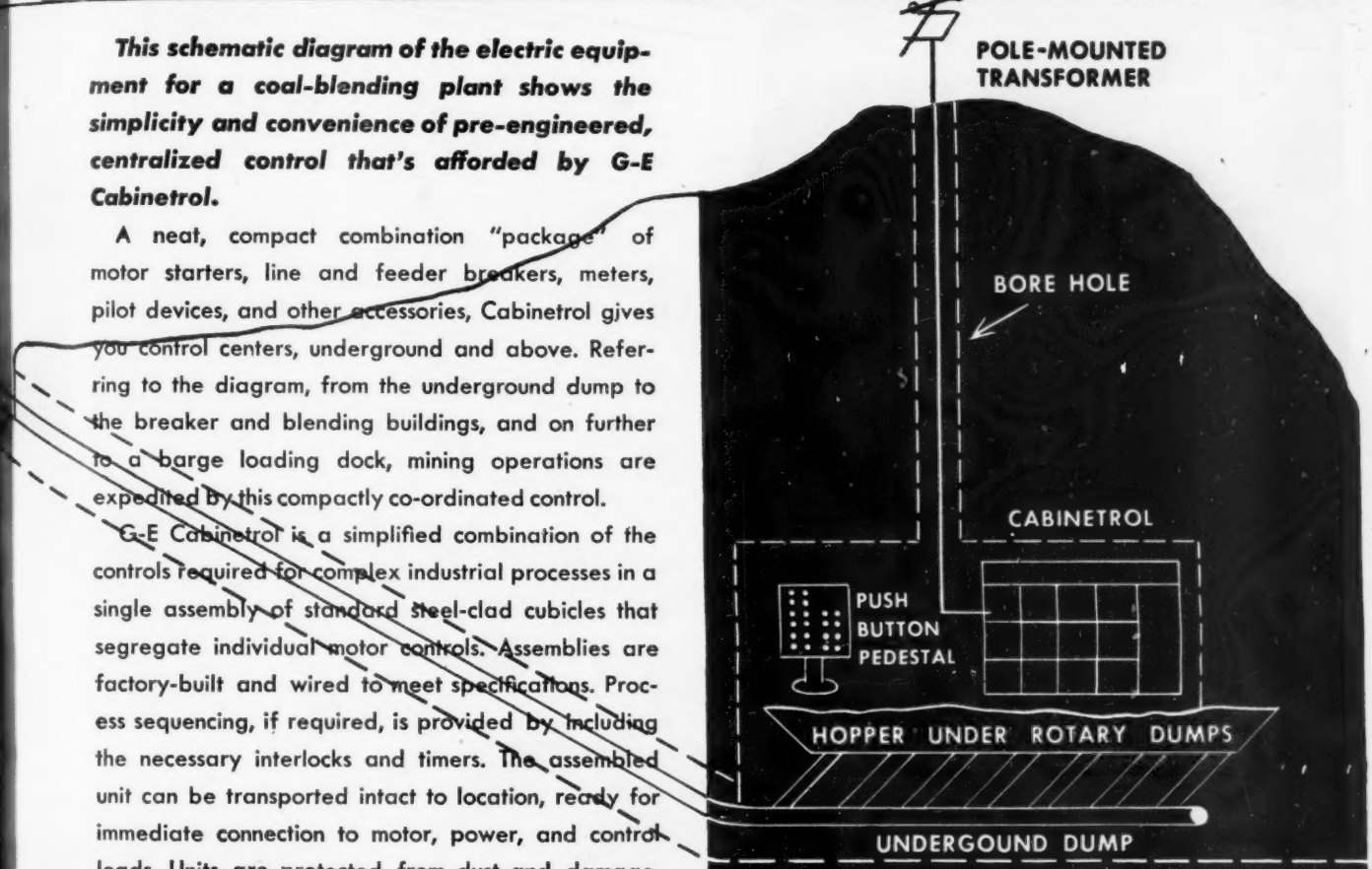




Standard, yet pre-engineered for your specific job, G-E Cabinetrol combines all the essential controls and other coal mine electric equipment in a compact, neat appearing, dust-proof, and safe cabinet group.

This Coal-blending Layout Shows the Simplification and Protection You Get with G-E CABINETROL





This schematic diagram of the electric equipment for a coal-blending plant shows the simplicity and convenience of pre-engineered, centralized control that's afforded by G-E Cabinetrol.

A neat, compact combination "package" of motor starters, line and feeder breakers, meters, pilot devices, and other accessories, Cabinetrol gives you control centers, underground and above. Referring to the diagram, from the underground dump to the breaker and blending buildings, and on further to a barge loading dock, mining operations are expedited by this compactly co-ordinated control.

G-E Cabinetrol is a simplified combination of the controls required for complex industrial processes in a single assembly of standard steel-clad cubicles that segregate individual motor controls. Assemblies are factory-built and wired to meet specifications. Process sequencing, if required, is provided by including the necessary interlocks and timers. The assembled unit can be transported intact to location, ready for immediate connection to motor, power, and control leads. Units are protected from dust and damage. Dead-front construction offers protection to operators.

A G-E sales engineer will help you select the necessary components to make up a well-arranged Cabinetrol installation. He will be glad to show you and your engineers what G.E. has in mine motors, metal-clad switchgear, Pyranol* transformers, unit substations, overhead and underground cable, push-button control stations, and other electric equipment you might need. The "when" is up to you. *General Electric Co., Schenectady 5, N. Y.*

*Pyranol is the G-E trade-mark for askarel, a noninflammable, nonsludging insulating liquid.

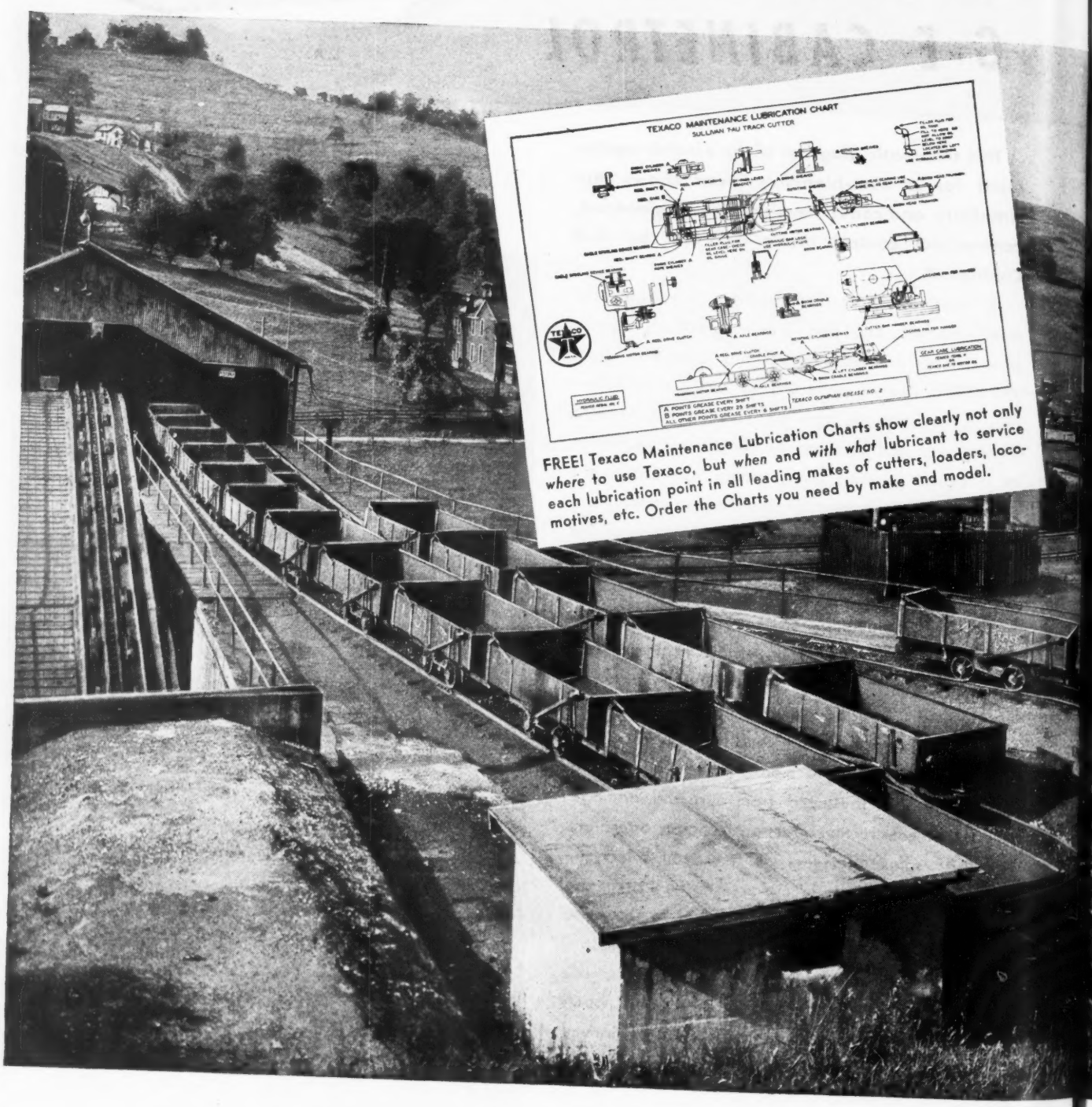
Buy all the BONDS you can—*and keep all you buy*

The above layout is part of a complete proposal G.E. has made up for a leading coal mine operator. The presentation included detailed recommendations on all electric equipment required.

Let G-E engineers show what they can accomplish for you by co-ordinated planning, and how teamwork is extremely essential for over-all simplification of electrical layouts and purchasing economy. A simple way to start is via the nearest G-E representative.

GENERAL ELECTRIC

Fast Returns::


TEXACO MAINTENANCE LUBRICATION CHART
SULLIVAN 74U TRACK CUTTER
TEXACO
GEAR CASE LUBRICATION
HYDRAULIC FLUID
A. POINTS GREASE EVERY SHIFT
B. POINTS GREASE EVERY 25 SHIFTS
ALL OTHER POINTS GREASE EVERY 6 SHIFTS
TEXACO OLYMPIAN GREASE NO. 2

FREE! Texaco Maintenance Lubrication Charts show clearly not only *where* to use Texaco, but *when* and *with what* lubricant to service each lubrication point in all leading makes of cutters, loaders, locomotives, etc. Order the Charts you need by make and model.

TEXACO

TEXACO LUBRICANTS

Higher Output

TO HELP meet record tonnage quotas, empty cars must constantly be available for loading *when* and *where* they're needed. Saving even as little as one or two minutes per trip increases the productive time of men and machines, results in higher output.

Prompt return of empty cars to working faces depends not only on adequate spur tracks and pick-up systems, but also on cars ready to roll *instantly* and *smoothly*. And to experienced operators everywhere, this means effective lubrication of car wheels — assured by the use of Texaco.

Texaco Olympian Grease, for example, is ideal for mine car wheels, especially in cold weather. It assures easier starting at low temperatures, longer-lasting bearings, less need for repairs. Application and gun refilling are easy. *Olympian* is equally effective for cutters, loaders and other equipment.

Texaco lubricants for all types of underground coal mining machinery are approved by leading manufacturers who have cooperated with us in preparing Texaco Maintenance Lubrication Charts.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States. The Texas Company, *National Sales Division, Dept. C,* 135 East 42nd Street, New York 17, N. Y.

For the Coal Mining Industry

ROE

WHERE TONNAGE TALKS...

BLING

. . YOU CAN'T TAKE WIRE ROPE FOR GRANTED!

AND TALKING OF TONNAGE, output hits bottom when hoist lines or drag lines let go. That's why you can't take wire rope for granted! That's why you can't depend on "just as good" wire rope.

And that's why you need Roebling's *tough* "Blue Center" Wire Rope for *tough* strip mining operations! Its proven stamina to deliver long service . . . its engineering—in our plant and on your job—assures economical operation by reducing costly shutdowns and expensive maintenance practices.

But find out for yourself how Roebling "Blue Center" Wire Rope fights fatigue and abrasion; how its extra strength and flexibility make it tops for mining operations involving the use of small sheaves . . . as well as *all* general heavy-duty mine work.

And find out, too, how Roebling engineers can help you choose the *right* rope for *every* operation. A telephone call to our nearest branch office is the first step towards greater returns from your rope-rigged equipment. Why not make it today?

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PACEMAKER IN WIRE PRODUCTS

QUESTIONS AND ANSWERS

Q Why are three or more seizings recommended to hold the end of a rope when one would keep it from unraveling?

A *With non-preformed rope it is almost impossible to hold the strands sufficiently tight with one seizing. If rope lay is lost or if any of the strands is allowed to shift from its balanced relation with respect to the others, improper rope life will very likely result.*

Q Is it necessary to use seizings on a preformed rope?

A *It is not necessary to use seizings to keep preformed rope from unlaying because all wires and strands are set to their helical forms. However, it is advisable to use seizings to prevent the strands from being forcibly unlaid and distorted when cutting or handling the rope. Naturally, preformed rope must be seized when preparing it for socketing.*

Q Is it wrong to stagger the clips on a thimble and clip attachment?

A *Yes. The live end of the rope should be protected against crushing and abuse by placing the body of all clips against this side. All U-bolts should be on the short, or dead end of the rope.*

Engineered for Extra dependability INSIDE and OUT

WALWORTH No. 95 BRONZE GLOBE VALVE

Where throttling is not required

Improved lock-on, slip-off disc holder. Re-new disc. Union bonnet for extra strength.

Non-heating hand-wheel. High quality bronze body casting. Screwed or flanged ends.

WALWORTH No. 245 P BRONZE GLOBE VALVE

Where throttling is required

Removable seat and disc. Hard copper-nickel discs. Stainless steel seat rings.

Non-heating hand-wheel. High quality bronze body casting. Screwed or flanged ends.

Both of these popular Walworth Bronze valves are recommended for general service – No. 95 where throttling is not required, No. 245P where frequent throttling is required. No. 95 is rated at 150 pounds steam pressure. Its improved renewable disc and lock-on, slip-off disc holder – originally developed by Walworth – saves time and trouble. No. 245P, rated at 200 pounds steam pressure, features extra hard discs and seat rings that are highly resistant to abrasion, erosion, wire-drawing, and galling. These Walworth quality valves Nos. 95 and 245P are made of the high-grade bronze known as Navy Composition M.

These valves are famous for their economy and long, reliable service. In design and construction they reflect the unusual sturdiness and efficiency of all Walworth Valves, the result of "know-how" gained by more than a century of valve manufacturing experience.

For further information on Walworth's complete line of valves and fittings get in touch with your Walworth distributor, or write for a free copy of Catalog 42.

ARMY E NAVY

11 AWARDS TO 4 PLANTS

WALWORTH

valves AND fittings

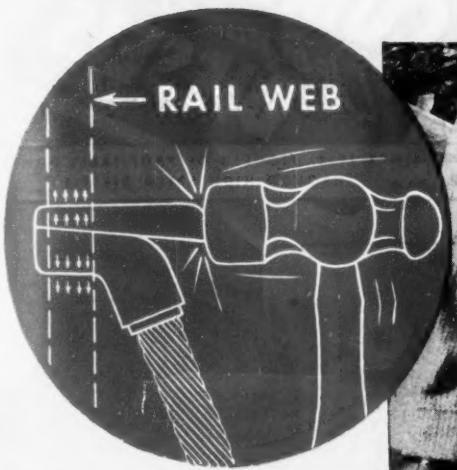
60 EAST 42nd STREET, NEW YORK 17, N. Y.

WALWORTH ★ VALVES AND FITTINGS ★ ESTABLISHED 1842

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

EAT YOUR CAKE and have it, too!

You can install more Rail Bonds per hour and STILL do a BETTER bonding job with O-B Wedge Bonds



Two or three blows with an ordinary hammer develop 20,000 lbs. expansion pressure—effectively "cold-welding" the Wedge Bond terminal to the rail—forming a perfect, permanent mechanical and electrical joint.

●

A few seconds Mobildrilling time . . . a few hammer blows . . . That's all that is required to apply O-B Wedge Bonds.

- ***Easier to install . . . .***
- ***Faster to apply . . . .***
- ***More simple to reclaim . . . .***
- ***Yet absolutely dependable!***

No 2551M

Ohio Brass

MANSFIELD, OHIO

CANADIAN OHIO BRASS COMPANY, LTD.
NIAGARA FALLS, ONTARIO

KEEP BUYING WAR BONDS

SPECIFY O-B WEDGE BONDS FOR UNIFORM RETURN CIRCUIT CONSTRUCTION

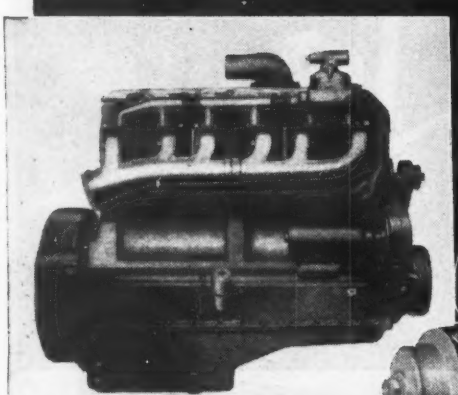
DETROIT PUBLIC LIBRARY

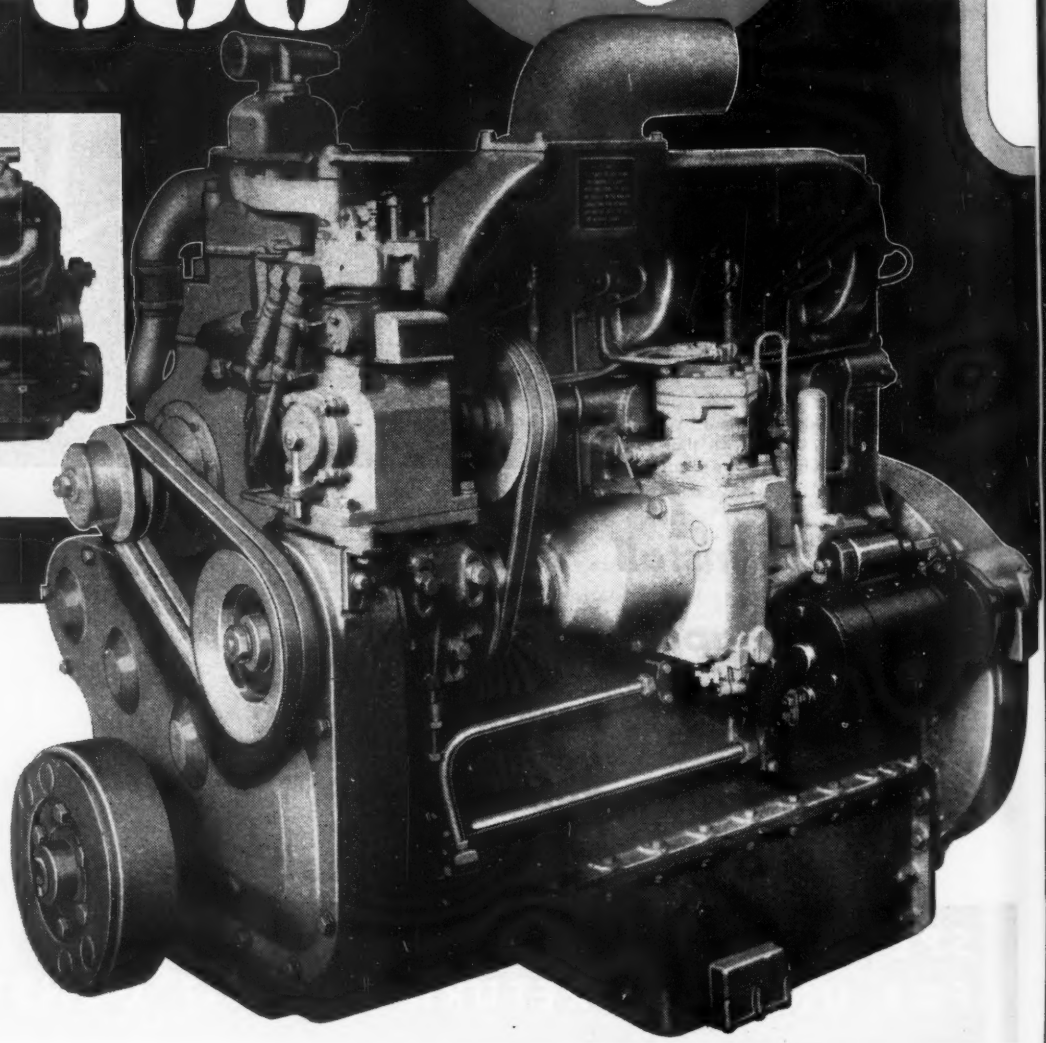
Nth Degree in Power

Models NH-600 and NHS-600

CUMMINS *Dependable* DIESELS

SINCE 1918...PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS





200 hp.

Model NH-600, 200 hp. at 2100 rpm. (maximum). Designed for heavy-duty automotive, industrial and marine service. For specifications, see table on opposite page.

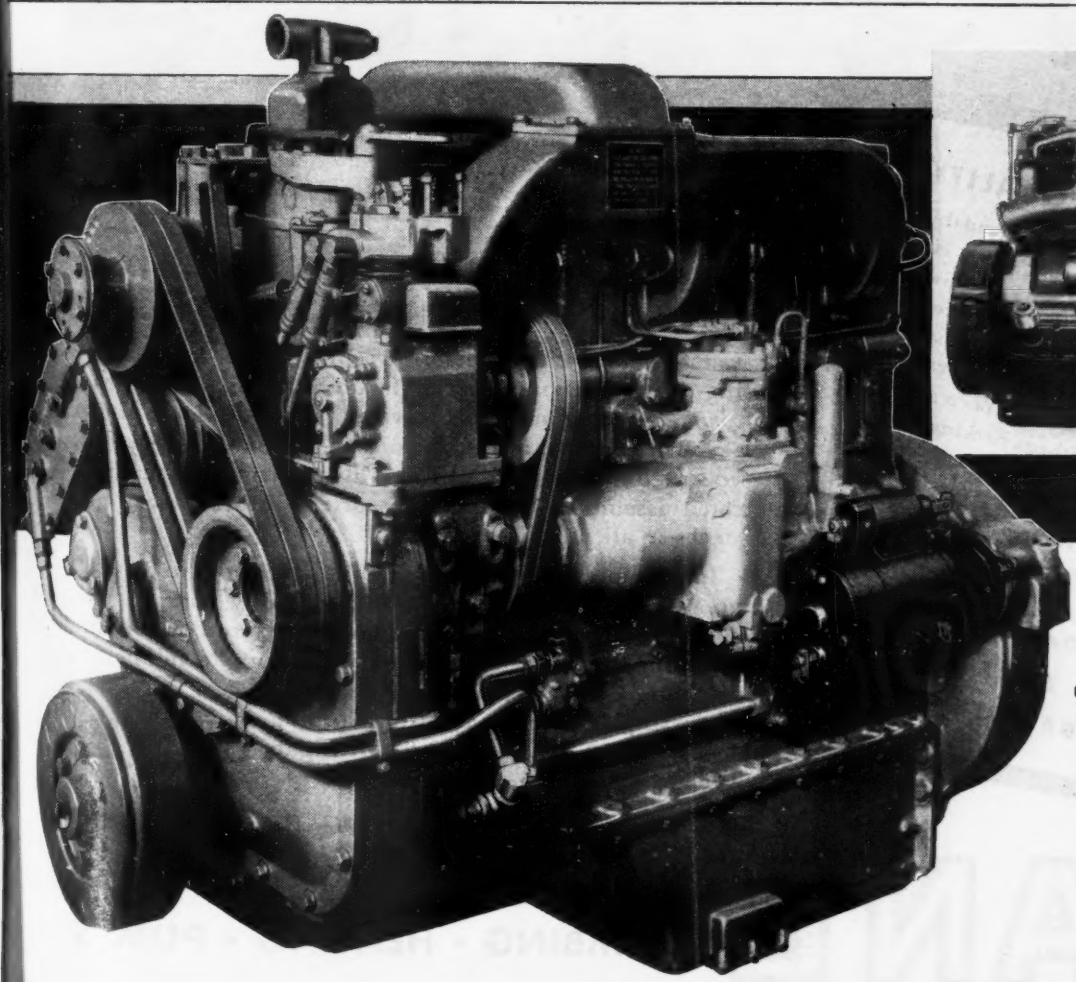
Combining "something old and something new," Cummins—builder of the *original* high speed diesel—now introduces two additions to the line of Cummins Dependable Diesels: Models NH-600 and NHS-600.

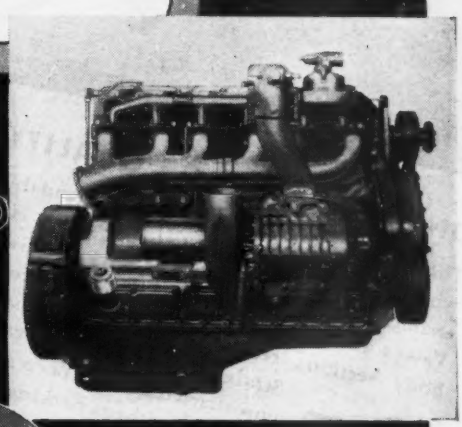
The "something old" is the basic design of the well-known Model H Cummins Diesel . . . a design proved sound by a 12-year demonstration of low-cost, dependable performance in all types of heavy-duty applications.

The "something new" in NH and NHS Cummins Diesels includes dual intake and exhaust valves, higher rpm., larger piston displacement and many other refinements that will give you "more power per pound" and the Nth degree in power efficiency . . . that will assure increased payloads and higher profits on your *tough* jobs—automotive, industrial or marine. A comprehensive brochure containing complete specifications and engineering data on Series NH and NHS Cummins Dependable Diesels is now available. Write for your copy of Bulletin 5206-24 today. CUMMINS ENGINE COMPANY, INC., Columbus, Indiana.

Model	No. of Cyl.	Bore and Stroke	Displacement (cu. in.)	HP. (Maximum)	RPM. (Maximum)	*Weight	Weight per Horsepower	*Dimensions
H	6	4⅞" x 6"	672	150	1800	2165	14.43	57⅜" x 46 ½" x 30¼"
HS	6	4⅞" x 6"	672	200	1800	2580	12.9	58⅝" x 46 ⅜" x 29⅜"
NH	6	5⅛" x 6"	743	200	2100	2500	12.5	58⅜" x 49 ⅜" x 28⅞"
NHS	6	5⅛" x 6"	743	275	2100	2850	10.36	60⅜" x 48⅜" x 32⅜"

*Weights and dimensions are for engine as designed for automotive application (as illustrated) and will vary with units designed for industrial and marine service. Weights are based on minimum use of light weight materials.

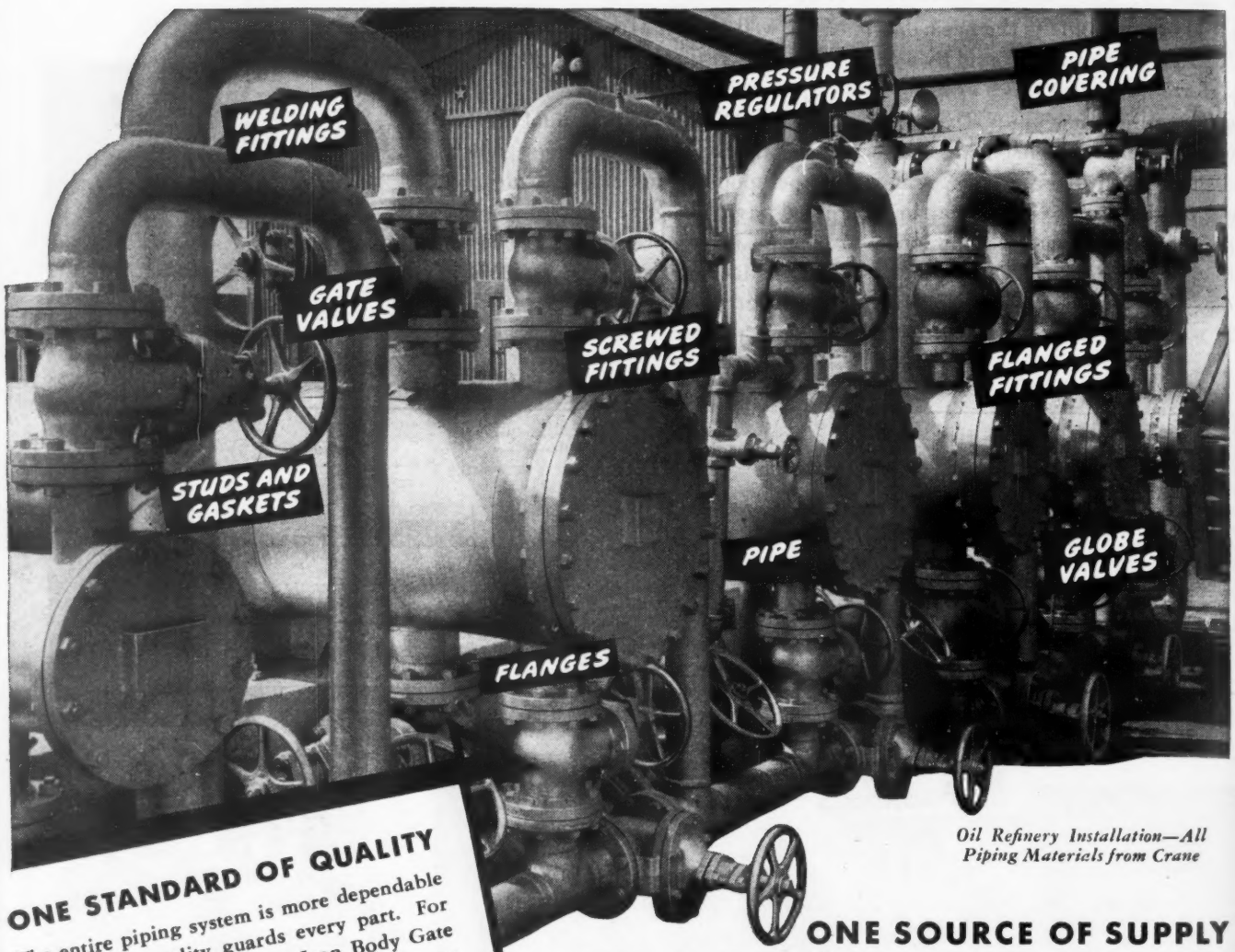




275 hp.

Supercharged Model NHS-600, 275 hp. at 2100 rpm. (maximum). Designed for heavy-duty automotive, industrial and marine service. For specifications, see table above.

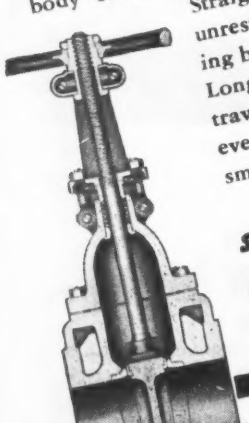
Call Crane for All Materials for Any Piping System



Oil Refinery Installation—All Piping Materials from Crane

ONE STANDARD OF QUALITY

The entire piping system is more dependable when Crane quality guards every part. For example, here's what Crane Iron Body Gate Valves add to pipe line performance. Strong body sections resist severest line stresses. Straight-through ports permit unrestricted flow. A deep stuffing box lengthens packing life. Long disc guides keep disc travel true, while finest design in every part insures long life, and smooth, trouble-free service.



STANDARD IRON BODY WEDGE GATE VALVES

ONE SOURCE OF SUPPLY
ONE RESPONSIBILITY FOR ALL PARTS

Catching up with war-deferred replacements—from ordering to installation of parts—is simplified by using Crane *complete* piping materials service. From one single source—your Crane Branch or Wholesaler—you get everything you need for any application. Valves, fittings, pipe, fabricated assemblies, piping accessories—in brass, iron and steel—in all pressure classes.

In all piping items the Crane line gives you the world's greatest selection. With one responsibility guarding the quality of all materials, you are better assured of good installations. At the same time you are getting the full benefit of Crane Co.'s 90-year experience and leadership in meeting industry's piping needs. CRANE CO., 836 S. Michigan Avenue, Chicago 5, Illinois.

90 YEARS OF PROGRESS 1855 1945

Branches and Wholesalers Serving All Industrial Areas

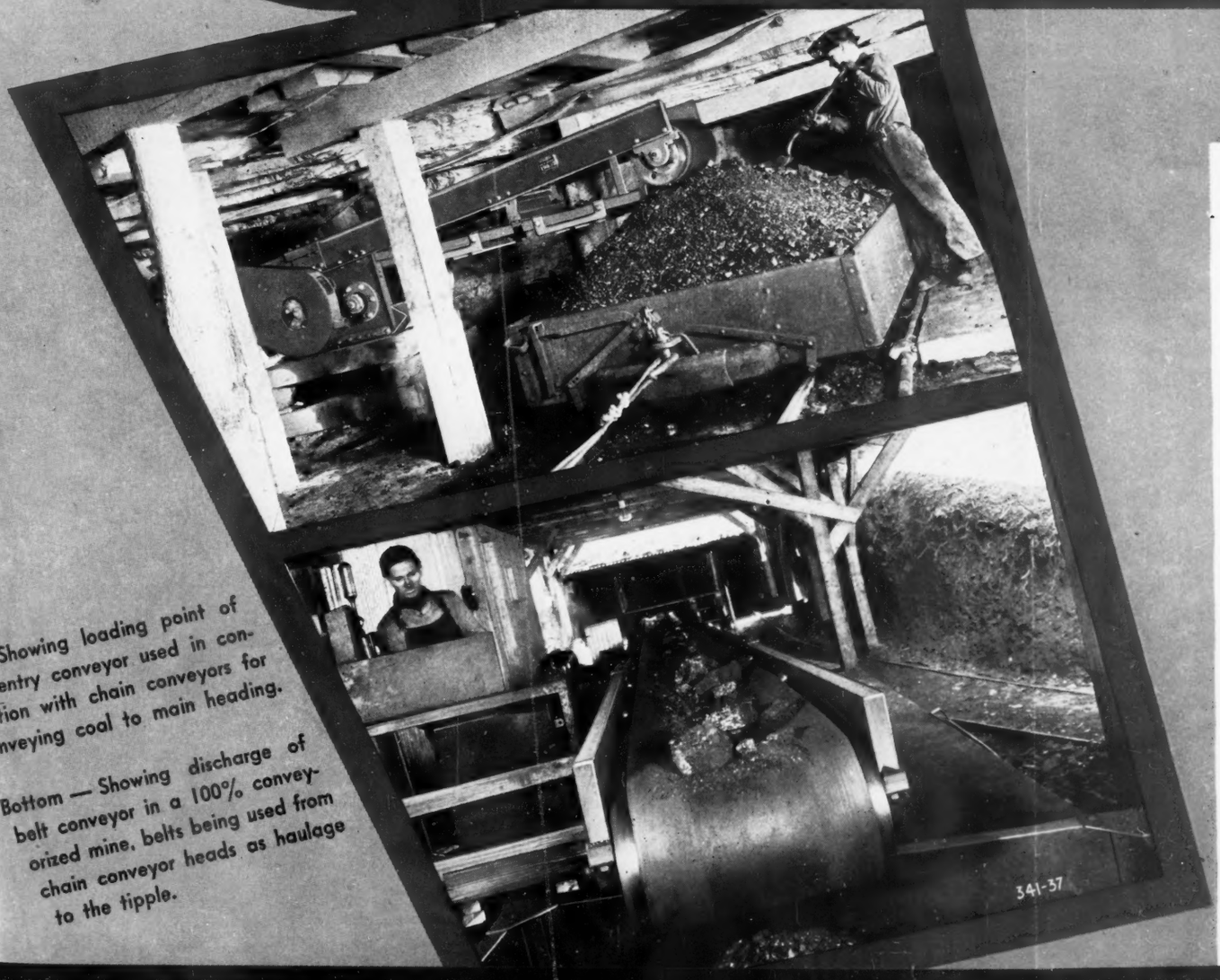
CRANE

VALVES • FITTINGS • PIPE
PLUMBING • HEATING • PUMPS

Left—Face operation showing actual loading at the face in a 32-inch seam of coal.

Right — Loading point on butt heading of battery of chain conveyors.

Modern Installations of JEFFREY CONV



Top — Showing loading point of b[illegible] entry conveyor used in con[illegible]ction with chain conveyors for [illegible]conveying coal to main heading.

Bottom — Showing discharge of belt conveyor in a 100% conveyorized mine, belts being used from chain conveyor heads as haulage to the tipple.

PRESE
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21 typ
be ma
mining

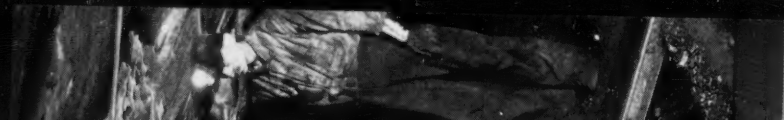
CONVEYORS

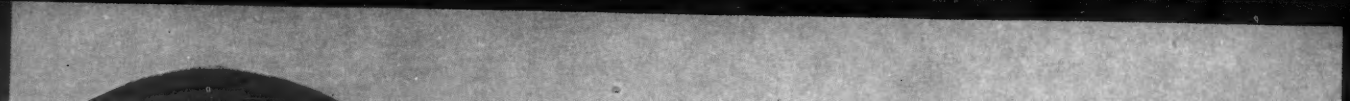
Chain and Belt Types

PRESENT-DAY Jeffrey Conveyors are modern and incorporate the following important features essential to successful and profitable conveyor mining:

- Rugged construction
- Durable materials
- Lightweight design to facilitate moving
- Dependable power equipment
- Economical operation and maintenance
- Competent Engineers to assist with the installation and training of workmen

21 types of conveyors from which many combinations can be made to meet the various conditions encountered in mining.



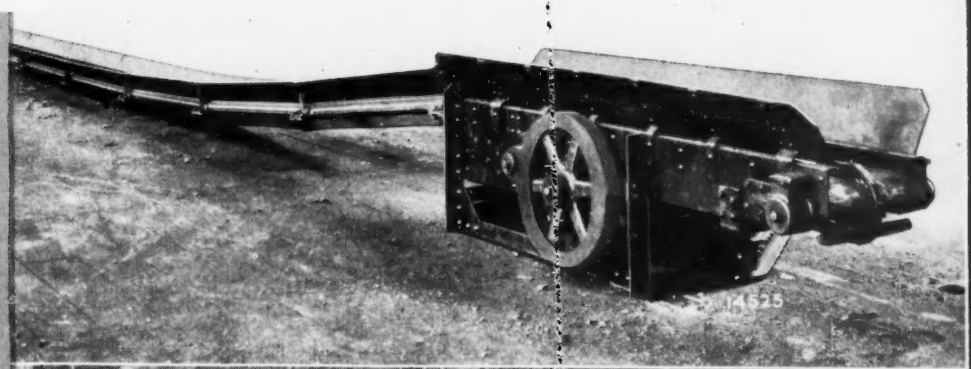


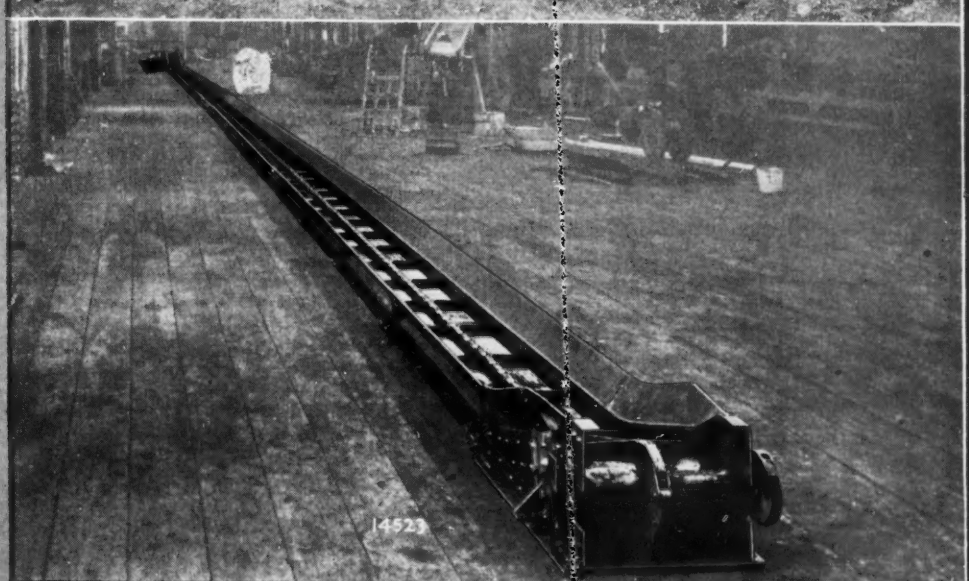
JEFFREY

Mechanical Mine Equipment Since 1880

CONVEYORS

Among the first methods used for continuous transportation of coal. The views on this page show the head and tail end of a Jeffrey Conveyor of twenty-five years ago.





BUY WAR BONDS

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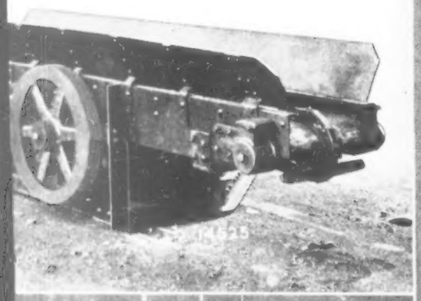
of twenty-five years ago.



Jeffrey

SERVES THE INDUSTRY BELOW AND ABOVE GROUND FROM FACE TO RAILROAD CAR

CUTTERS
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CONVEYORS
BLOWERS
JIGS
CRUSHERS
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THE JEFFREY MANUFACTURING COMPANY

Established in 1877

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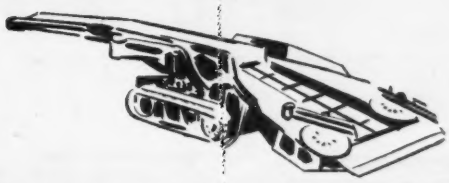
Foreign Plants:	Jeffrey Mfg. Co., Ltd. Montreal, Quebec	British Jeffrey-Diamond, Ltd. Wakefield, England		Jeffrey-Galion (Pty), Ltd. Johannesburg, S. A.	

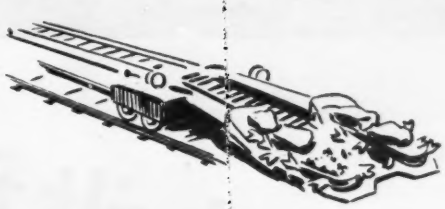
LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . .

LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . .

How to get

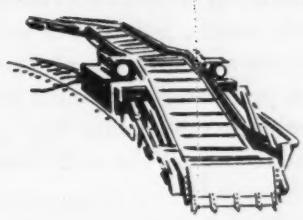


better lubrication



for all types

of coal loaders



except a shovel

Your choice of mechanical loader lubricants depends upon:

- **The make of loader you use**
- **The age of your loaders**
- **The severity of operating conditions**
- **Your maintenance schedules**
- **Your lubrication schedules**

ANY ONE of all of these factors may have changed since you last analyzed them and adopted your present loader lubricant. If repairs and replacements on loaders have increased, it may not be entirely due to over-work and longer hours of operation alone. But they are good reasons for taking another look at your present lubrication needs now.

Another reason is the Mine Lubrication Service Standard Oil offers. Thoroughly experienced Lubrication Engineers are available to operators in the middle western states shown on the map. These specialists can be reached through the Standard Oil Industrial Service Representative who calls on you. They are thoroughly familiar with the lubricating requirements of all types of loaders and with the problems confronting you today in the proper lubrication and maintenance of loaders.

They have many types of special loader lubricants to choose from to meet the requirements of your equipment and operating conditions.

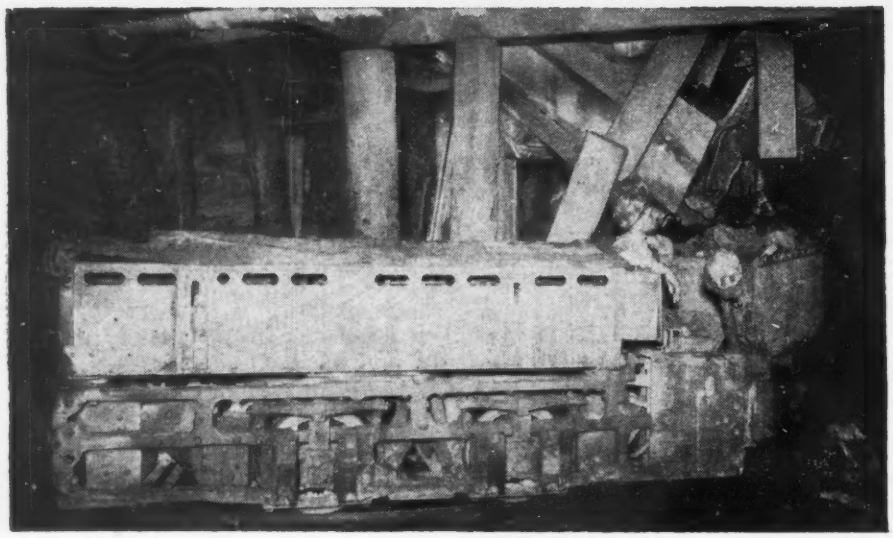
Ask the Standard Oil man who calls on you, or write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, and make a date with this Mine Lubrication Specialist.

Gasoline Powers the Attack . . . Don't Waste a Drop!

. . . . . .

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

★ LUBRICATION ENGINEERING



BOTH are built for TOUGH service

Your locomotives and shuttle cars withstand the rough, hard usage of mine transportation because they are built of steel. Edison Alkaline Batteries are built for the same kind of tough service. Containers, covers, pole pieces and other structural parts of these batteries are built of steel. Even the active materials are locked in perforated steel tubes and pockets. These in turn are securely assembled into steel grids to form the positive and negative plates. The steel cover is welded onto the container.

Because of their steel cell construction, alkaline batteries are by far the most rugged of all storage batteries. When it comes to standing up in mine haulage service, they have no equal.

Alkaline batteries in locomotives have fallen down shafts and gone through many wrecks with little or no damage . . . and still delivered their full service life. The fact they can withstand such accidents, indicates the extra dependability that can be expected of them under more normal conditions. Their durable mechanical construction is also one of the principal reasons why alkaline batteries stay on the job and out of the repair shop, give longer life and help cut haulage costs. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, New Jersey.*

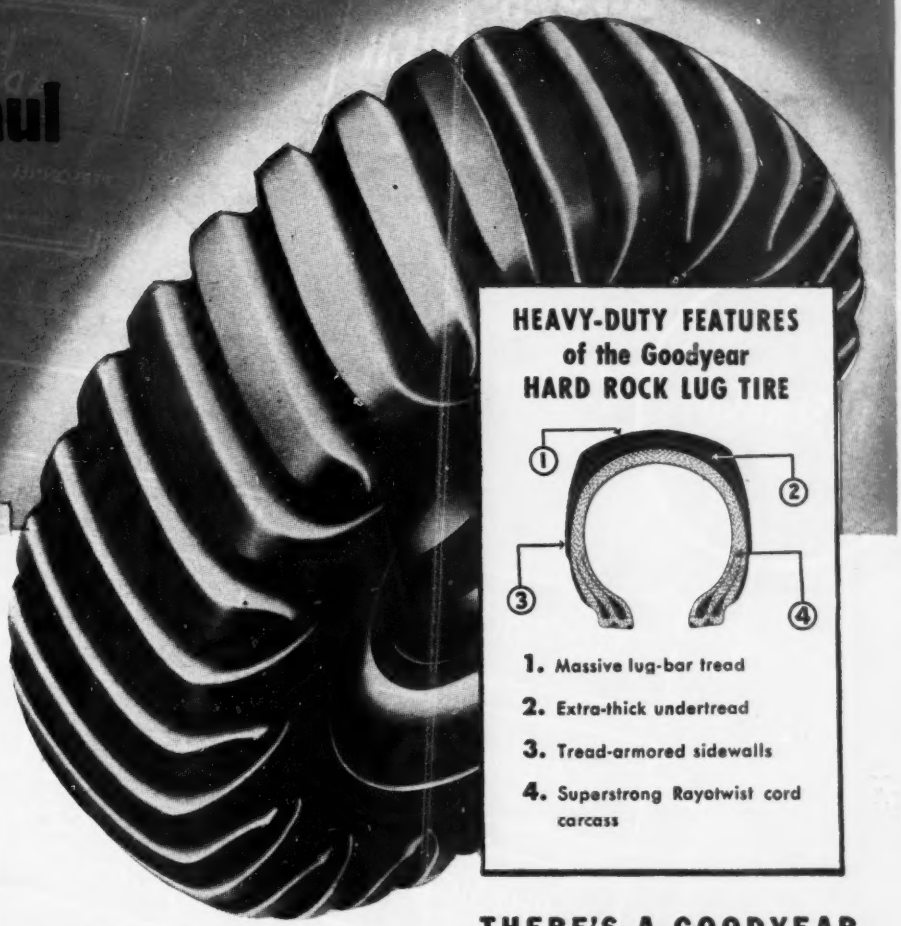
In Mine Locomotives and Shuttle Cars Alkaline Batteries Give You These Important Advantages

- They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.
- They are **foolproof electrically;** are not injured by short circuiting, reverse charging or similar accidents; are free from self-deteriorating reactions.
- They can be **charged rapidly;** do not require critical adjustment of charge rates; can be charged directly from mine d-c supply.
- They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling.
- They can **stand idle indefinitely** without injury, without attention, and without expense.
- They are **simple and easy to maintain.**

Edison
ALKALINE BATTERIES

GREATEST JOB STAMINA

on every bruising haul



HEAVY-DUTY FEATURES of the Goodyear HARD ROCK LUG TIRE

1. Massive lug-bar tread
2. Extra-thick undertread
3. Tread-armored sidewalls
4. Superstrong Rayotwist cord carcass

YEARS of top-notch performance prove the standout stamina of Goodyear's Hard Rock Lug tire on the toughest, most bruising jobs of all.

Specially designed for rough, hard work, this brawny giant is armor-built throughout – with extra-heavy undertread and with massive, wide-based lugs that grip and guard, extending well over the shoulders to *tread-armor* the sidewalls against cuts and bruises.

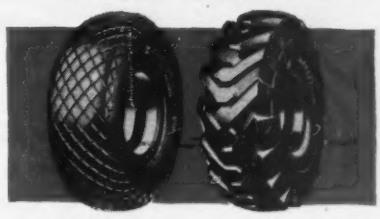
What's more, it's powered with Goodyear's famous universal two-way tread. No rights, no lefts, it has the same great grip reverse or forward. And it's a self-cleaning tread, with straight, wide, V-shaped grooves open at the ends and so pitched that dirt and stones actually slide out as the tire turns!

Now this time-proved bruise-master – built from materials available today, including the mandatory amount of synthetic rubber – is tougher than ever, thanks to its Rayotwist body – made from Goodyear's patented rayon cord – *the strongest body we've ever used in a work tire.*

It is all these advantages combined that make Goodyear Hard Rock Lugs first choice with men who must move heavy loads over the toughest, roughest ground.

BUY WAR BONDS—BUY FOR KEEPS

THERE'S A GOODYEAR FOR EVERY JOB



For drawn vehicles specify Goodyear All-Weather Earth-Mover

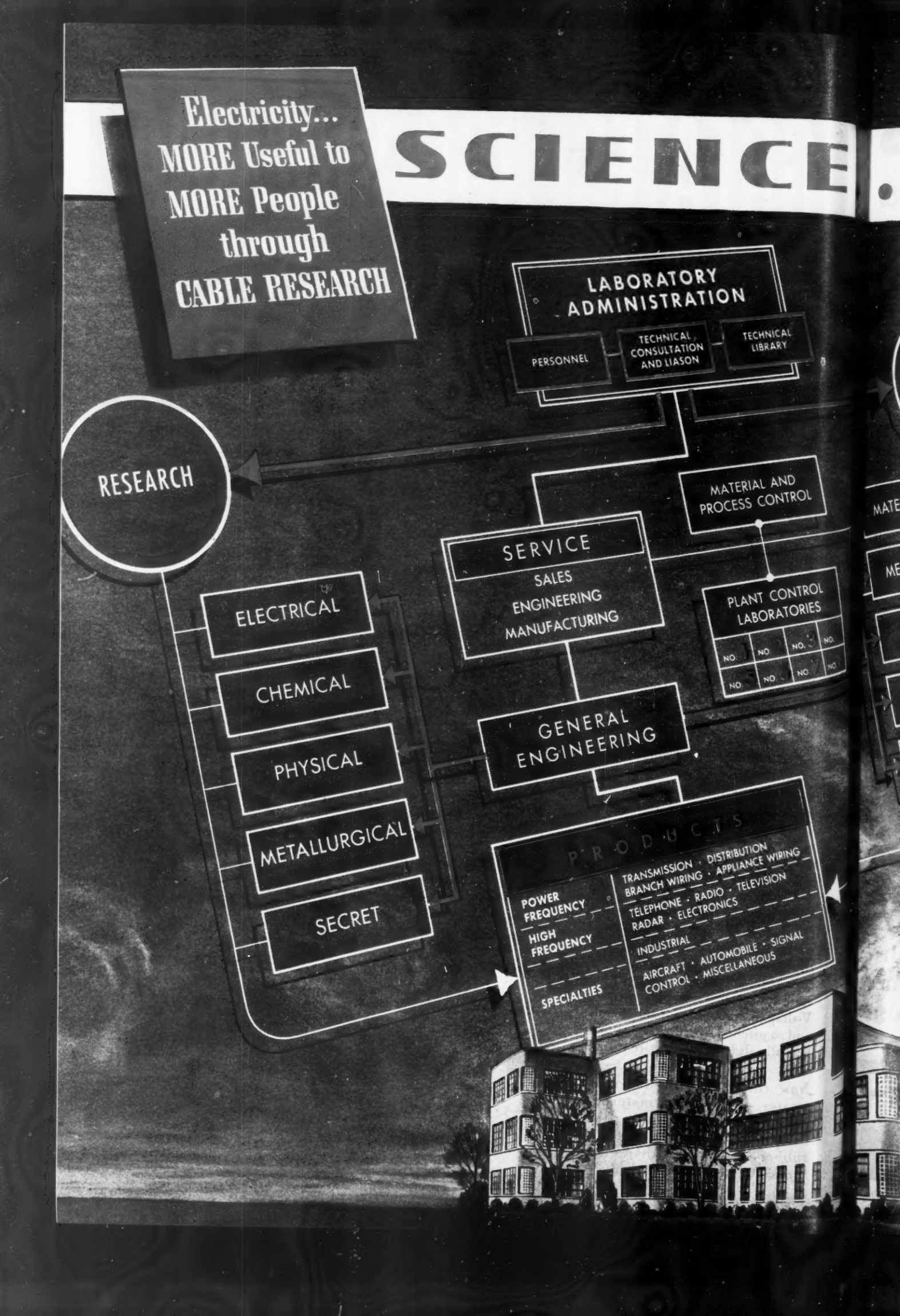
For traction in soft going specify Goodyear Sure-Grip

Rayotwist, All-Weather, Sure-Grip—T. M.'s The Goodyear Tire & Rubber Company

GOODYEAR

THE GREATEST NAME IN RUBBER

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND


Electricity...
MORE Useful to
MORE People
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AND LIASON
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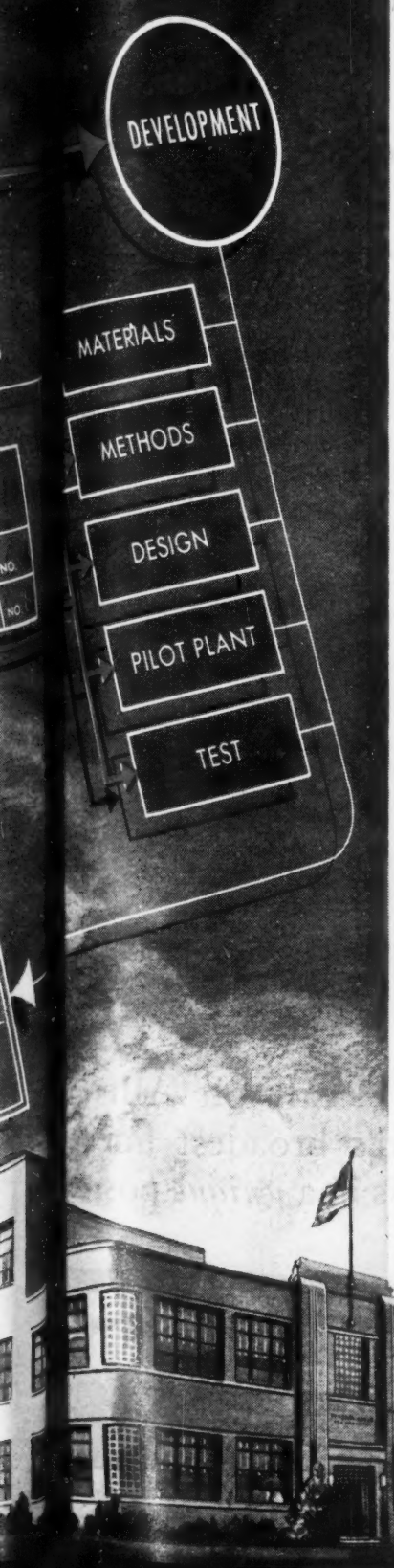


The General Cable Research Laboratory is by no means an end in itself. The great, new building, its facilities and scientific equipment are but an impressive and efficient tool in the hands of the men who are bringing into being this Company's far-visioned industrial program.

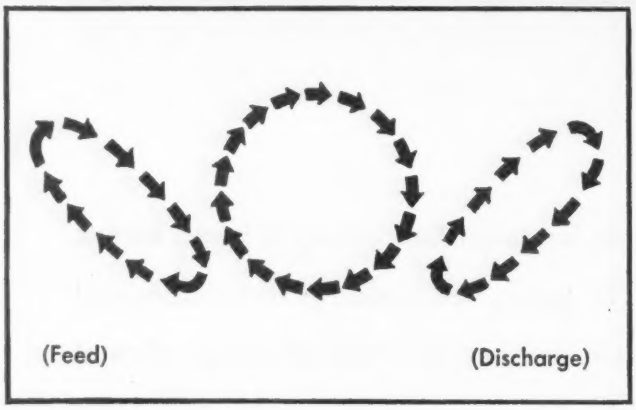
Here, pure and applied research go hand in hand with product development, to extend the use of electricity more usefully to more and more people. The achievements now in the making and the achievements of tomorrow will complement the substantial advances already "on the record", by virtue of which General Cable has won and maintained its position in the industry. Research is the spearhead of progress.

GENERAL CABLE CORPORATION

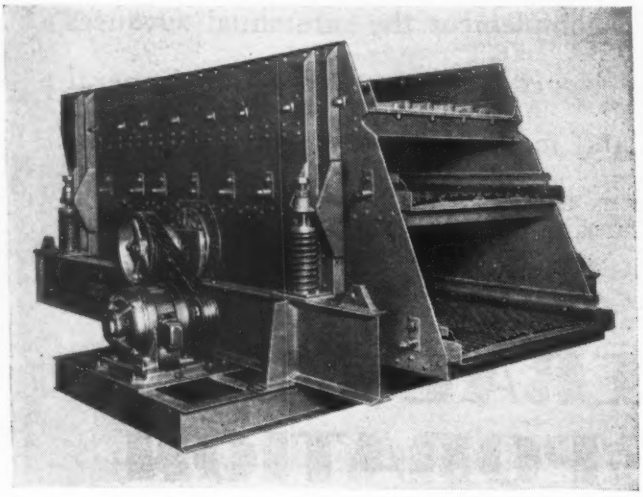
Manufacturers of Bare and Insulated Wires and Cables for Every Electrical Purpose

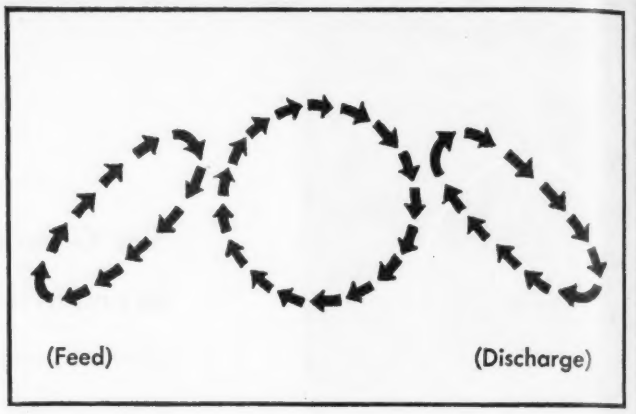
Which Vibrating Screen is t

THE BASIC TYPES. ALLIS-CHALMERS

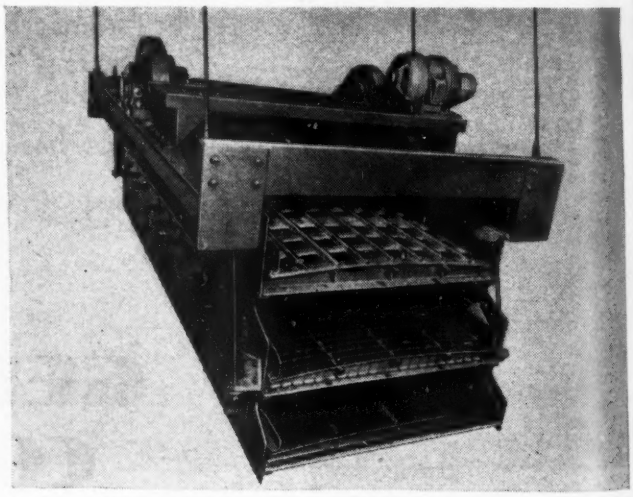


1 STYLE "C" SCREEN — a 4-bearing extra-heavy duty screen designed for large feed. Elliptical motion at feed end tends to *retard* travel of large pieces; circular motion at center *increases* rate of travel; elliptical motion at discharge end *further accelerates* rate of travel — to give you rapid scalping operation. This principle of vibratory motion assures highly efficient separation, especially where feed contains a wide range of particle sizes. Examples: "run of mine ore," quarry material, and pit run material.





2 STYLE "B" SCREEN — a 4-bearing heavy duty screen designed for medium-large feed. Eccentric balanced mechanism mounted above the screen produces an elliptical motion at feed end that starts material at a *rapid rate;* circular motion at center that *slows down* rate of travel; elliptical motion at discharge end that *further retards* rate of travel . . . to provide ample time for efficient screening. Because of this principle of motion, Style "B" screens are equally adapted for wet screening, washing, or sizing. Bulletin B6005.



NEXT TIME you have a problem . . . call on Allis-Chalmers. Building one of the world's broadest lines of mining and processing equipment, A-C is in a *unique* posi-

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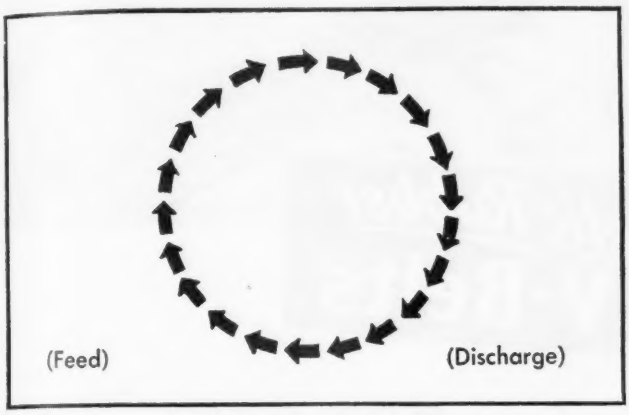
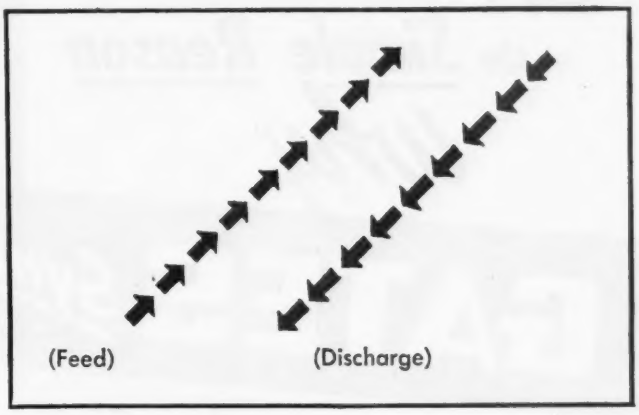
WE PLAN FOR PEACE
BASIC EQUIPMENT FOR COAL INDUSTRIES:
ALLIS
Vibrating Screens, all types for Wet or Dry Separation
Electric Motors, Control, Texrope V-Belt Drives

the Best for You? HERE ARE 4 OF

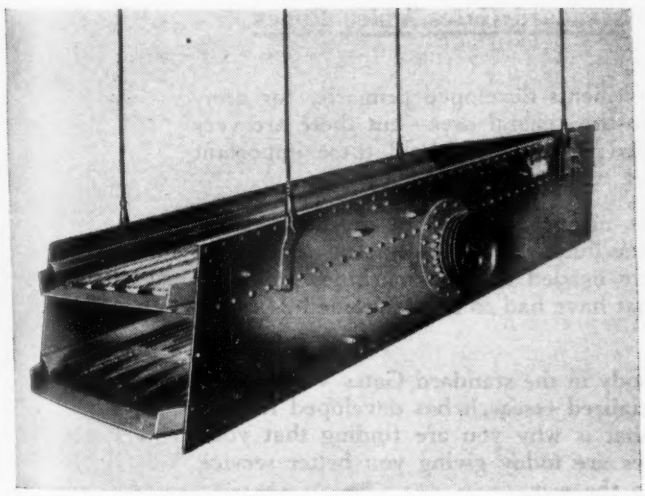
OFFERS YOU A CHOICE FROM ALL 4 . . .

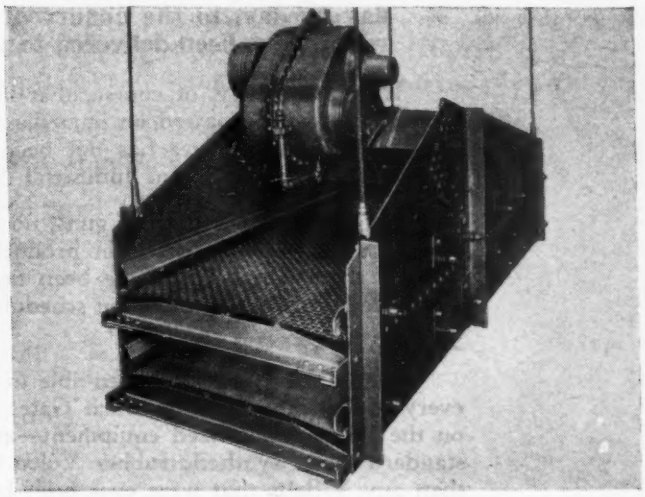




3 RIPL-FLO SCREEN — a 2-bearing screen designed for moderate to heavy duty, fine to coarse screening. A circular vibratory motion *at all points* on screen surfaces is produced by an eccentric shaft and balanced mechanism. Eliminating 2 outer bearings and stationary support frame, the Ripl-Flo screen is *warranted* to perform the same *or better* screening job than conventional 4-bearing screens. Width and weight are also reduced — you save on *lower initial cost* and lower power requirement. Write for Bulletin B6151.

4 LOW-HEAD SCREEN — utilizing a combination of 45° *straight-line* motion and *horizontal* deck operation, the Low-Head screen is ideally suited for wet screening, washing, rinsing or dewatering. Is broadly used in screening of coal, aggregates, metal and non-metallic material, and in "sink-float" operation. And because it is designed for *horizontal* operation, the Low-Head screen saves both headroom and space . . . cuts dollar cost of installation or remodeling. For full particulars, write for Bulletin B6330.





tion to offer you valuable know-how in teaming up screens with other machinery in your plant. Contact our nearby district office, or write ALLIS-CHALMERS, MILWAUKEE. A 1787

♪ *Tune in the Boston Symphony, Blue Network, every Sat. Eve.*

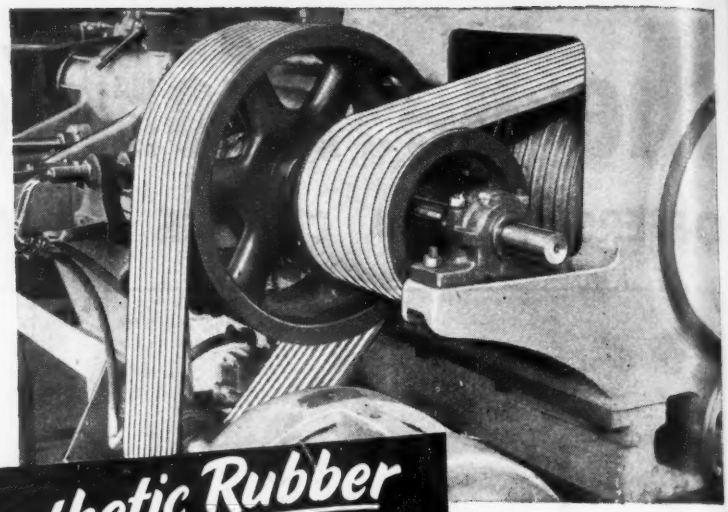
CHALMERS

Full line of Single & Multi-Stage Centrifugal Pumps

Mine Hoists—with automatic "Regulex" control

Crawler & Wheel-type Tractors, Allied Equipment

Circuit Breakers, Unit-Substations, Rectifiers



Here Is the ***Simple Reason*** *Why*

GATES *Synthetic Rubber* V-Belts

—Are Giving You Even *BETTER SERVICE* Than *Pre-War Belts* of *NATURAL RUBBER!*

NO ONE, before the war, had ever built a V-Belt that could stand the service now required by the Army's tanks, tractors, and self-propelled big guns. Gates has developed V-Belts that are now serving on army combat units all over the world—and has built these belts of synthetic rubber!

This fact is important to you now because every improvement developed by Gates for these Army belts has also been added, day by day, to the quality of the standard Gates Vulco Ropes which have been delivered to you.

It is only rarely, of course, that improvements developed primarily for army combat use can be passed on immediately to the general user—but there are very good reasons why Gates has not been called upon to withhold these important V-Belt improvements from Industrial V-Belt users.

The plain fact is that no guns, no tanks, no airplanes can be produced unless V-Belts are supplied to drive the producing machines. It is equally clear that better V-Belts than ever before have been urgently needed to keep machines going on the forced-draft, war-production schedules that have had to be maintained 24 hours a day!

That is why Gates has been able to embody in the standard Gates Vulco Rope every V-Belt improvement which Gates specialized research has developed for use on the Army's motorized equipment—and that is why you are finding that your standard Gates synthetic rubber Vulco Ropes are today giving you better service than any V-Belts that were ever built before the war.

THE MARK OF *Gates* SPECIALIZED RESEARCH

THE GATES RUBBER COMPANY

Engineering Offices and Stocks in All Large Industrial Centers

GATES VULCO ROPE DRIVES

CHICAGO 6, **ILL.** 549 West Washington
NEW YORK CITY 3, 215-219 Fourth Avenue
ATLANTA 3, **GA.** 738 C & S National Bank Building
LOS ANGELES 21, **CAL.** 2240 East Washington Boulevard
DENVER 17, **COLO.** 999 South Broadway
DETROIT 4, **MICH.** 8663 Grand River Avenue
PORTLAND 9, **ORE.** 333 N. W. 5th Avenue
DALLAS 2, **TEXAS** 1710 N. Market Street
SAN FRANCISCO 3, **CAL.** 1090 Bryant Street

AMERICAN CYANAMID COMPANY

announces the applicability of

HEAVY-MEDIA SEPARATION (SINK-FLOAT)

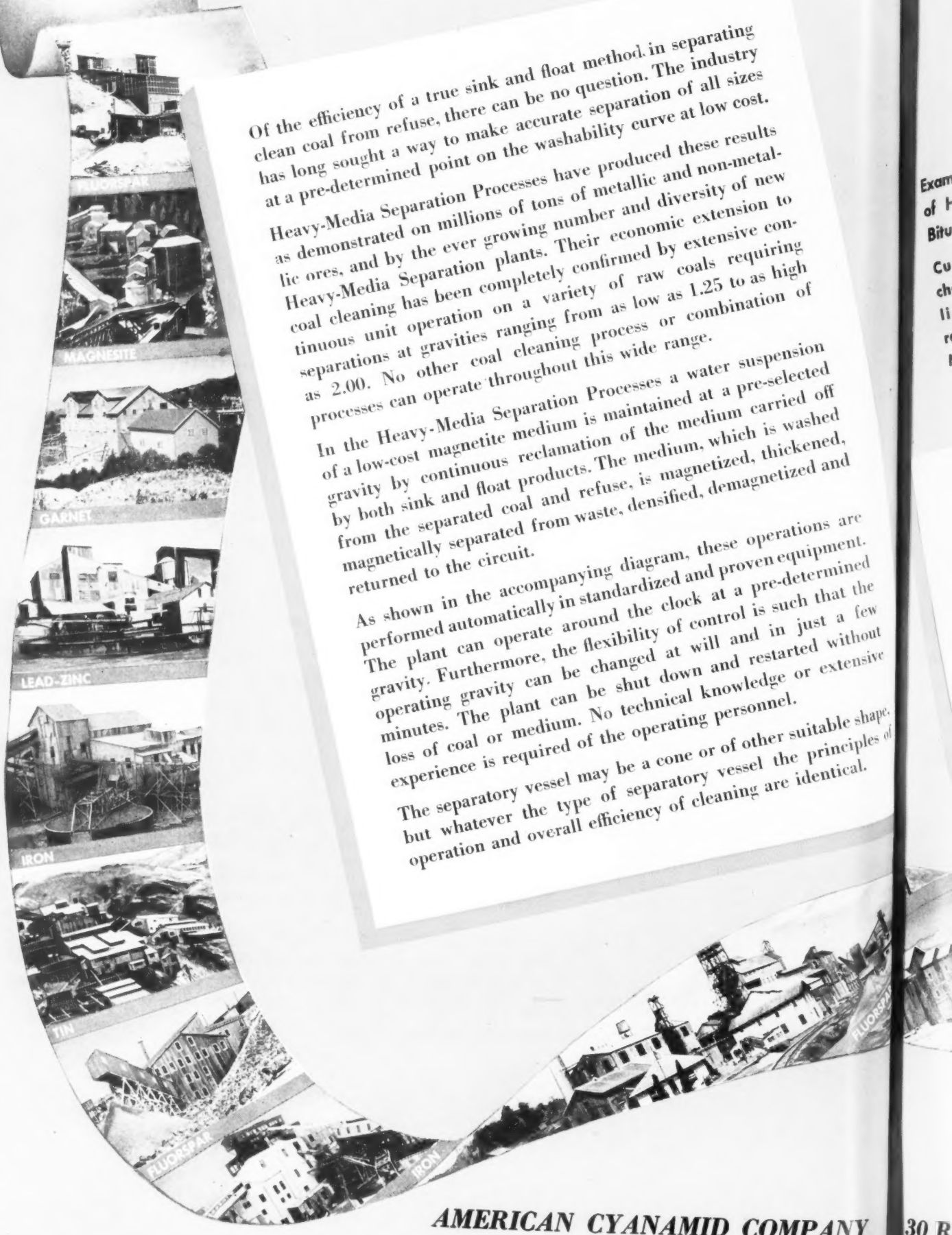
to Surface Coal Preparation

Many years of operation on a wide variety of materials has conclusively demonstrated these positive advantages of Heavy-Media Separation:

1. **Cleans at any pre-determined specific gravity from 1.25 to 3.4 in a closed circuit without effluent problems.**
2. **Continuously maintains the pre-selected specific gravity within plus or minus .01**
3. **Plant can be designed to make as many specific-gravity fractions as may be desired.**
4. **The specific gravity can be changed at any time and in a few minutes.**
5. **Uses low-cost medium, with a negligible loss.**
6. **Treats full size-range without pre-sizing.**
7. **Plant can be started and shut down without bank loss of clean coal or loss of operating efficiency.**
8. **Since the medium can be completely recovered from fine coal present in the circuit, loss of coal and medium due to inefficient pre-sizing caused by variable moisture in the raw coal feed is no longer a serious consideration.**

AMERICAN CYANAMID COMPANY *30 Rockefeller Plaza, New York 20, N.Y.*

APPLICATIONS of HEAVY-MEDIA SEPARATION PROCESSES offered by CYANAMID



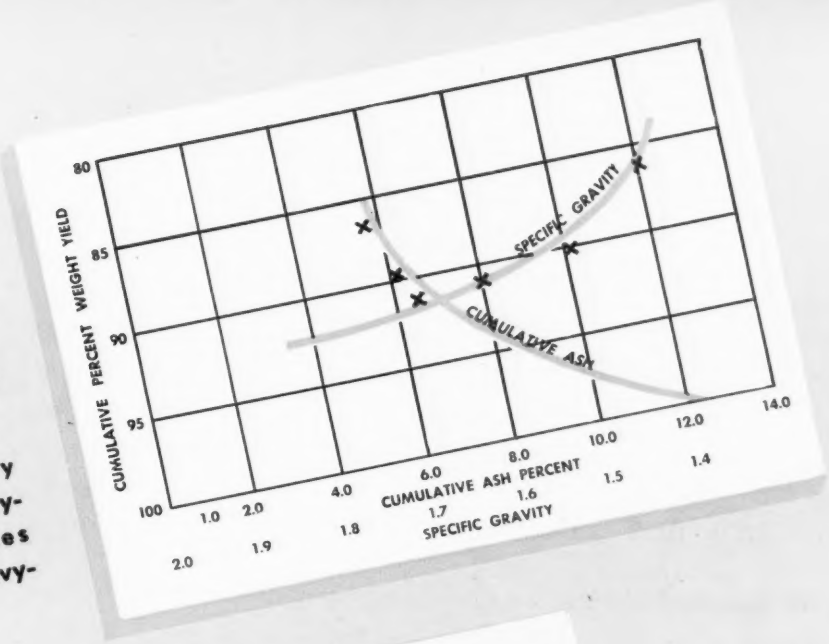
Of the efficiency of a true sink and float method in separating clean coal from refuse, there can be no question. The industry has long sought a way to make accurate separation of all sizes at a pre-determined point on the washability curve at low cost.

Heavy-Media Separation Processes have produced these results as demonstrated on millions of tons of metallic and non-metallic ores, and by the ever growing number and diversity of new Heavy-Media Separation plants. Their economic extension to coal cleaning has been completely confirmed by extensive continuous unit operation on a variety of raw coals requiring separations at gravities ranging from as low as 1.25 to as high as 2.00. No other coal cleaning process or combination of processes can operate throughout this wide range.

In the Heavy-Media Separation Processes a water suspension of a low-cost magnetite medium is maintained at a pre-selected gravity by continuous reclamation of the medium carried off by both sink and float products. The medium, which is washed from the separated coal and refuse, is magnetized, thickened, magnetically separated from waste, densified, demagnetized and returned to the circuit.

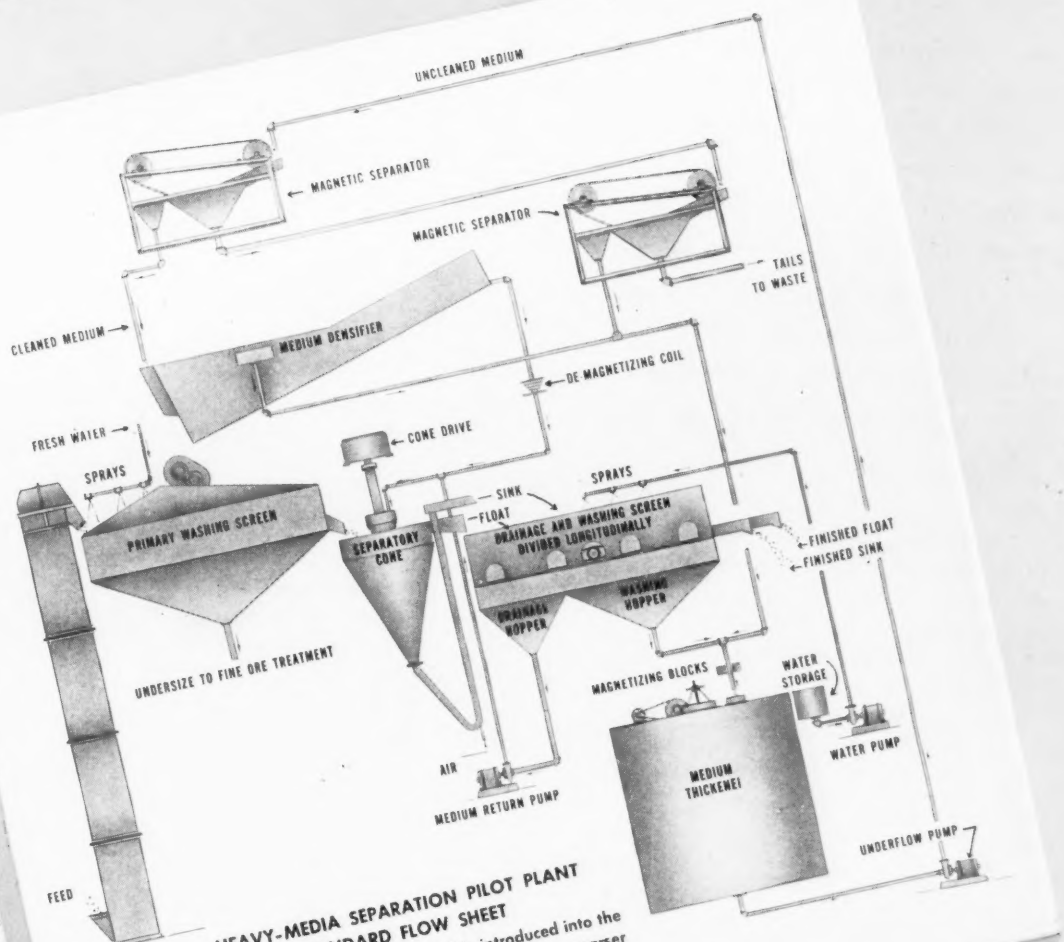
As shown in the accompanying diagram, these operations are performed automatically in standardized and proven equipment. The plant can operate around the clock at a pre-determined gravity. Furthermore, the flexibility of control is such that the operating gravity can be changed at will and in just a few minutes. The plant can be shut down and restarted without loss of coal or medium. No technical knowledge or extensive experience is required of the operating personnel.

The separatory vessel may be a cone or of other suitable shape, but whatever the type of separatory vessel the principles of operation and overall efficiency of cleaning are identical.



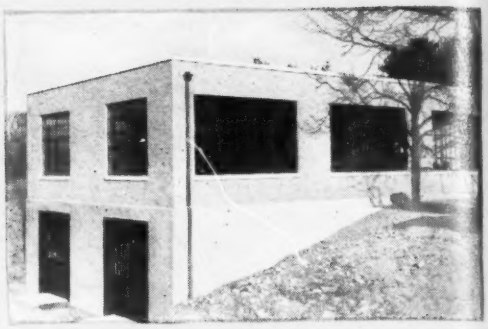
Example of Separating Efficiency of Heavy-Media Separation on Bituminous Coal.

Curves represent washability characteristics based on heavy-liquid studies. The crosses represent actual results by Heavy-Media Separation.



HEAVY-MEDIA SEPARATION PILOT PLANT STANDARD FLOW SHEET

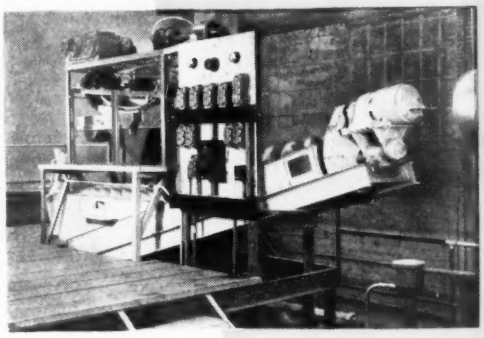
Other equipment (not shown here) is introduced into the flow scheme when it is necessary to treat sizes coarser or finer than those handled by equipment shown.



CYANAMID
TESTING and TECHNICAL SERVICE

At its Stamford Research Laboratory, Cyanamid is prepared to run continuous tests on carload lots of your coal on commercial-size equipment having a capacity of five tons per hour. Cyanamid is prepared also to contribute its experience gained in the diversified applications of Heavy-Media Separation to assist in developing a flow scheme best suited to individual requirements, and to assist in the design and operation of plants.

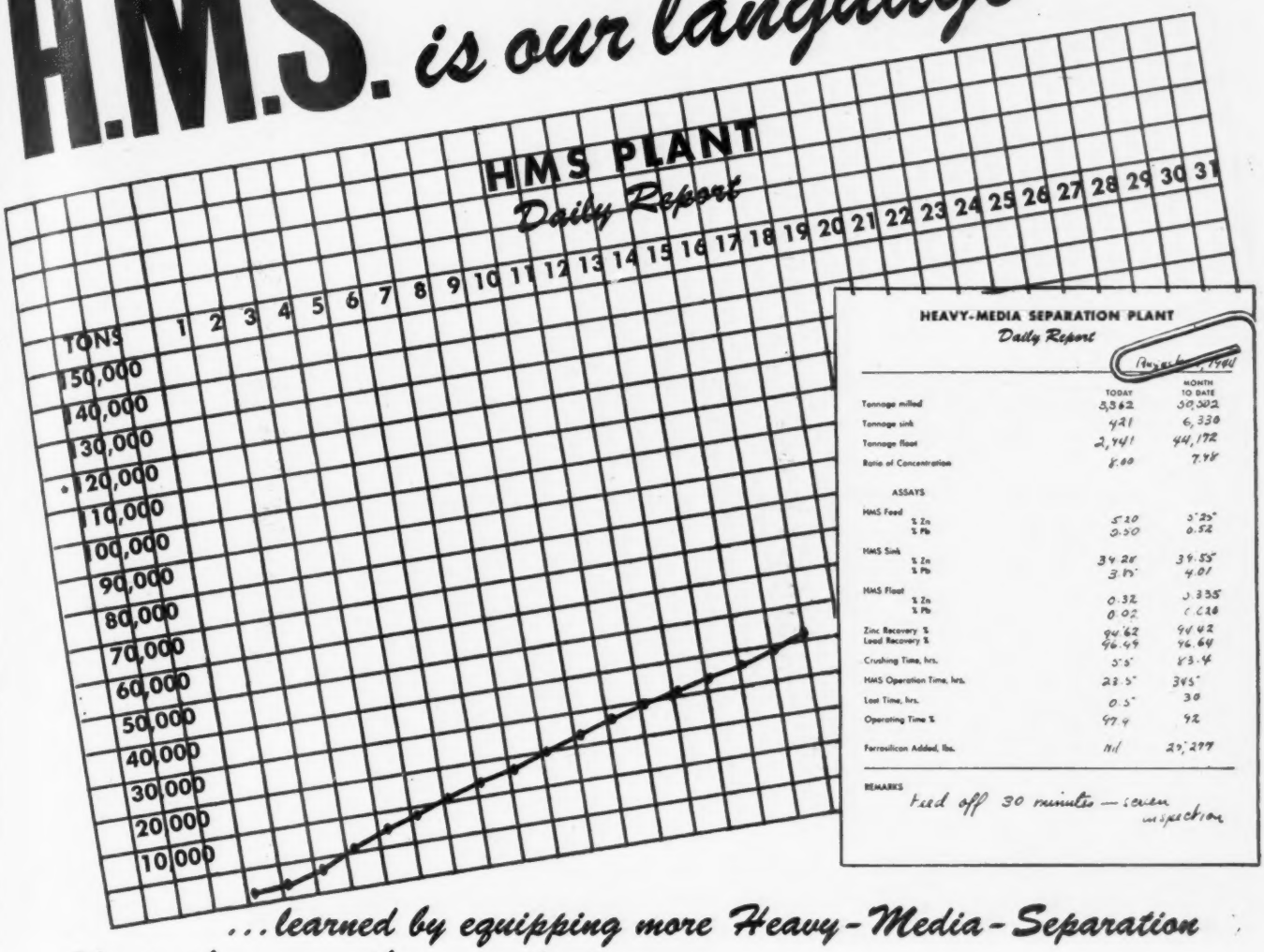
American Cyanamid Company will be pleased to receive inquiries from coal mining companies or contracting engineers of their selection, as well as others interested in coal preparation.



AMERICAN CYANAMID COMPANY

30 Rockefeller Plaza, New York 20, N. Y.

H.M.S. *is our language*

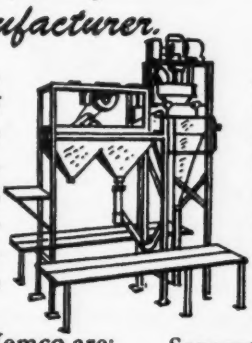


HEAVY-MEDIA SEPARATION PLANT
Daily Report

	TODAY	MONTH TO DATE
Tonnage milled	3,362	50,302
Tonnage sink	421	6,330
Tonnage float	2,941	44,172
Ratio of Concentration	8.00	7.48
ASSAYS		
HMS Feed % Zn	5.20	5.25
HMS Feed % Pb	0.50	0.52
HMS Sink % Zn	34.28	34.55
HMS Sink % Pb	3.15	4.01
HMS Float % Zn	0.32	0.335
HMS Float % Pb	0.02	0.020
Zinc Recovery %	94.62	94.42
Lead Recovery %	46.49	46.64
Crushing Time, hrs.	5.5	83.4
HMS Operation Time, hrs.	23.5	345
Lost Time, hrs.	0.5	30
Operating Time %	97.9	92
Ferrosilicon Added, lbs.	Nil	29,297

REMARKS: Feed off 30 minutes — screen inspection

...learned by equipping more Heavy-Media-Separation plants than any other manufacturer.



Wemco has more equipment experience to offer in the comparatively new field of Heavy-Media-Separation than any other manufacturer. Through solving the machinery problems of many of the HMS plants now in operation, Wemco engineers have accumulated a vast store of operating data in a field in which few have any experience.

Among the HMS plants equipped by Wemco are: *Western Fluorspar Corporation, Rosiclare Lead & Fluorspar Mining Co., Ore and Chemical Corporation, International Minerals & Chemical Corp., Northwest Magnesite Company, Lone Star Steel Company, and the Cleveland Cliffs Iron Mining Co.*

As an example of intelligent determination of equipment needs, Wemco has available an HMS Laboratory Unit for batch testing or for continuous testing up to 500 pounds per hour. Test results can be readily projected into full-scale plant designs.

HMS equipment manufactured by Wemco includes:

- Separatory Screws
- Separatory Cones
- Densifiers
- Special Thickeners
- Magnetizing Blocks
- Glandless Sand Pumps
- Solenoid Gates
- Special Media Separating Hoppers
- 20" HMS Laboratory Unit

672

If you are going HMS use Wemco

WEMCO

WESTERN MACHINERY COMPANY

760 FOLSOM STREET, SAN FRANCISCO, 7, CALIFORNIA

LOS ANGELES • SACRAMENTO • SPOKANE • SALT LAKE CITY • PHOENIX • DENVER • NEW YORK • WASHINGTON, D.C.

AGITATORS • FILTERS
DIAPHRAGM PUMPS
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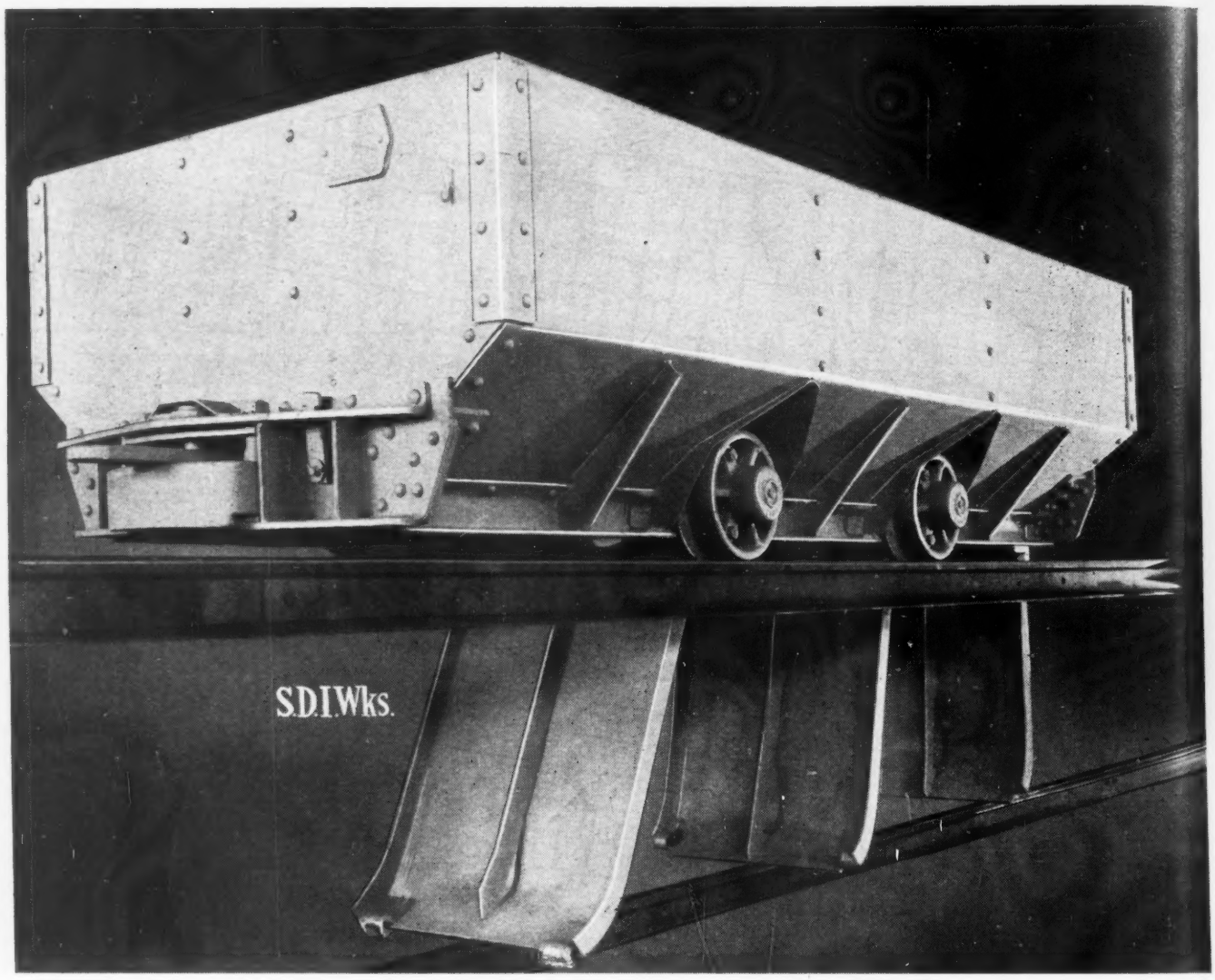
HYDROSEPARATORS
• • • THICKENERS • • •



WE LIFTED ITS FACE ON THE LATCH END

• The photograph above shows one of our modern S-D 1-2-3 "Automatic" bottom discharge cars. The new latch end is shown and its face has been lifted . . . smoothed out, with all the conventional outside tripping mechanism eliminated from the car.

How has it been done? The new S-D Di-Dapper Nock-out mechanism is responsible. The old-fashioned latch lever arm which extended beyond the side of the car, and which had to be raised by hand or some mechanism alongside of the track, has been done away with. No protruding lever arms to be bent in collisions, etc. remain.

The Automatic Di-Dapper Nock-out mechanism, at the bin, unlatches two independently-operated catches from underneath the car. Two latch hooks are provided for maximum safety. A simple provision is made for hand tripping cars of slate or rock enroute to tipple.

In this new car we have achieved our goal—the coal mine's most perfect mine car. The goal includes, man-less dumping — foolproof operation—greatest possible capacity for any given over-all dimensions—elimination of needless dead weight—smooth running, long lasting trucks—saving in lubrication cost—saving in the cost of electricity used in haulage—maximum reduction in cost of maintaining cars—reduction of coal breakage to the minimum. All of these results have been accomplished by the persisting effort of the engineers of the Sanford-Day Iron Works.

Write us for complete details on these remarkable developments.

• The S-D 1-2-3 "Automatic" pictured above has 12 ft. sides, is 5'6" wide, 3'4" high above rail, with a capacity approximating 4½ tons.

Sanford-Day Iron Works KNOXVILLE, TENNESSEE

with anthracite's most Powerful Electric Hoist

. . . 93 trips per hour to surface 420 tons of coal—*that's real production!* And that's the everyday record for this Westinghouse powered and controlled mine hoist—the most powerful in the anthracite field.

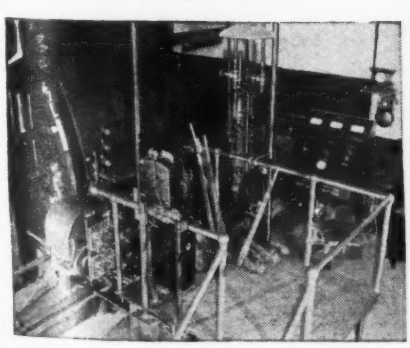
It takes a lot of horsepower to do a job like this—1750 in fact—supplied by this powerful pedestal-type, wound-rotor Westinghouse induction motor. Operating on 2200-volt, 3-phase, 25 cycle power, the motor drives a large gear unit, connected to a conical drum carrying the 1700 ft. of 1⅝" steel cable used to raise and lower the cages.

This hoist replaces an old 30 x 60 steam unit—and provides faster and more economical hoisting.

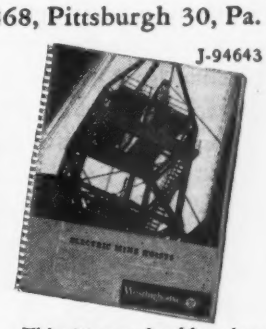
Conditions surrounding this installation were such that the purchase of low-cost, highly efficient alternating current equipment was recommended by Westinghouse engineers after a study of the requirements.

This is just another example of the ability of Westinghouse to solve the toughest mining problems. For a simple solution to your complex electrical problems, call your nearest Westinghouse Office. Westinghouse Electric & Mfg. Co., P.O. Box 868, Pittsburgh 30, Pa.

J-94643



CONTROL STATION—Primary hoist control is furnished by electro-pneumatically operated contactors. Secondary control gives 10-point acceleration through adjustable relays of the definite time-limit inductive type, operating on the last seven contactors. The first three points are under manual control. An electro-pneumatically operated air-brake contactor provides for reversal on the 2200-volt circuit.



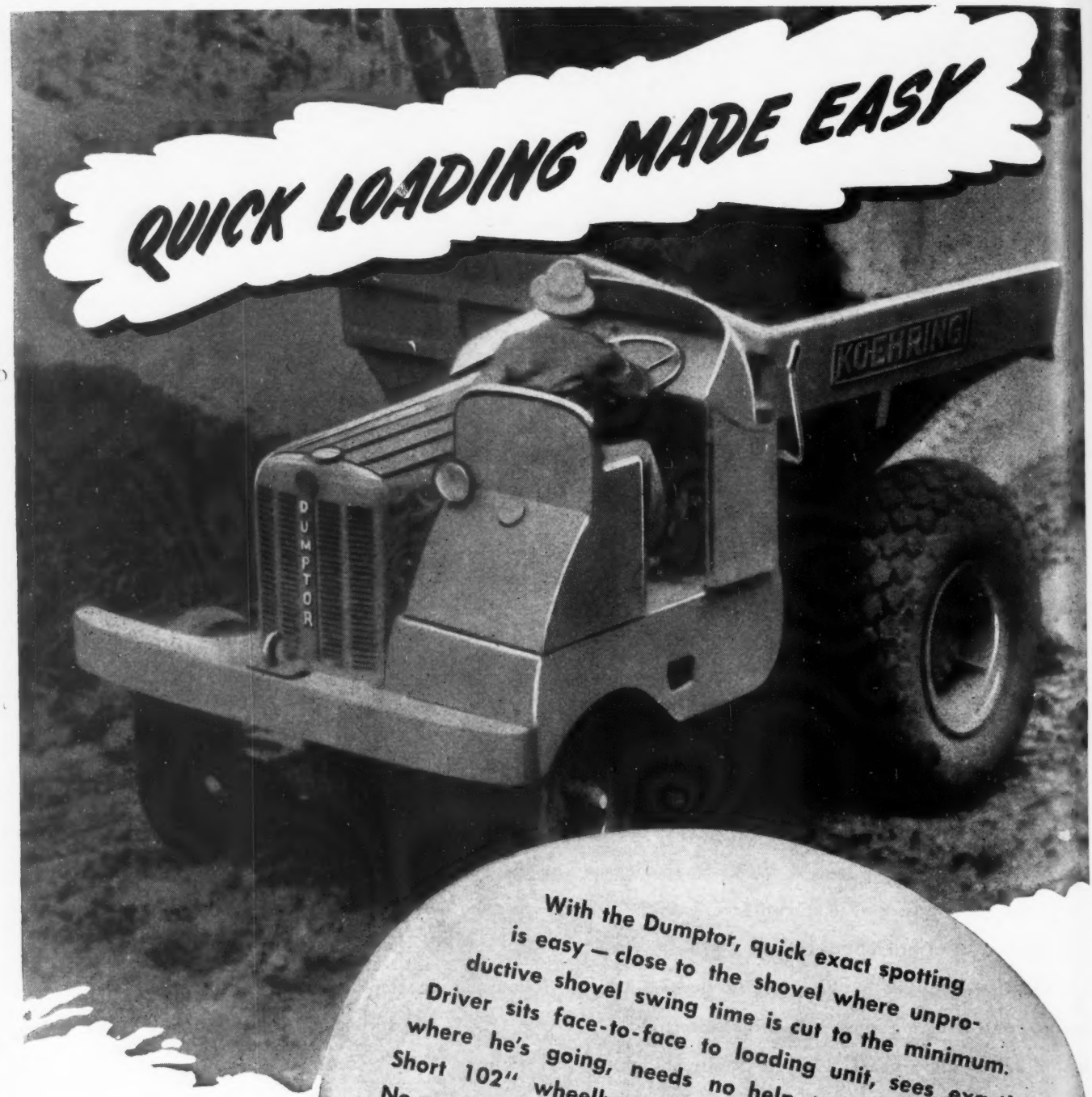
This 90-page booklet gives complete information on how to select electric hoist equipment to meet your special requirements. Write for free copy of B-3055 today.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

ELECTRICAL EQUIPMENT FOR THE MINING INDUSTRY

QUICK LOADING MADE EASY



With the Dumptor, quick exact spotting is easy — close to the shovel where unproductive shovel swing time is cut to the minimum. Driver sits face-to-face to loading unit, sees exactly where he's going, needs no help to gauge distances. Short 102" wheelbase assures close-in maneuverability. No need for hair-line calculations by shovel operators when loading the Dumptor. Body flares out to full 94½" x 93" top opening, big enough to catch its heaping 6-yard load without spilling. Tapered body construction means maximum balanced loads every trip.

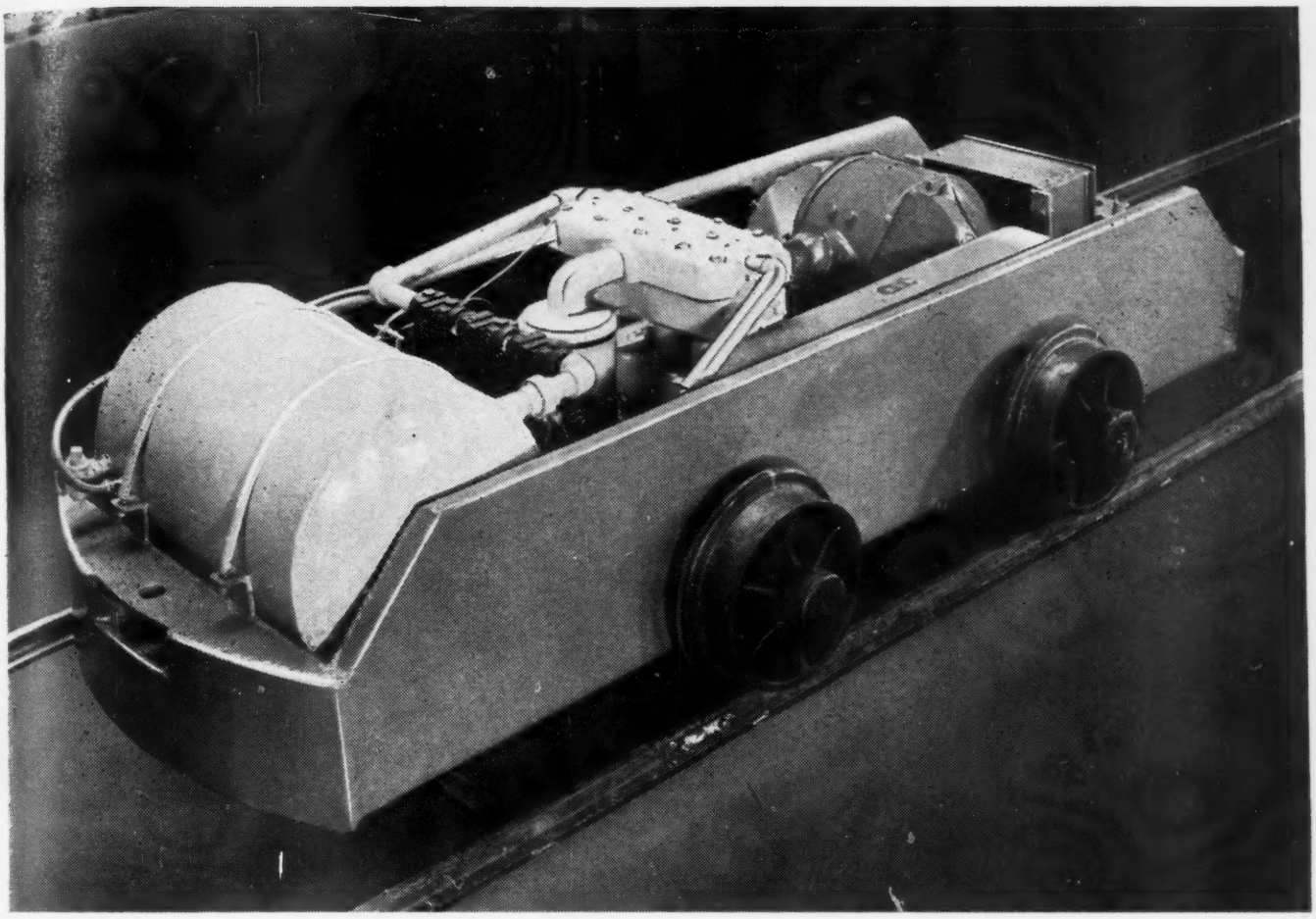
KOEHRING COMPANY
MILWAUKEE 10, WISCONSIN

Full, the Dumptor is quick on the get-away. Three reverse speeds, as fast as the three forward speeds, start the Dumptor on its way FAST—forward or backward.

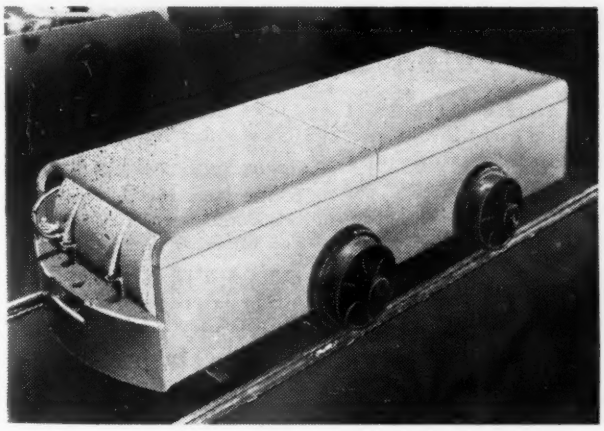
ARMY E NAVY

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT



Engineered Exclusively For The Coal Mining Industry



• *Note in top photo, the Cantrell "After-Cooler" between cylinder head and air receiver—an important compressor advantage in the Cantrell. The main frame constitutes a 25 gallon water capacity cooling system, with water under constant forced circulation. The Cantrell Type OMC is only 8 ft. 8 in. long and 26 in. high above rail and completely protected by solid bottom and quickly removable safety top, as shown in photo directly above.*

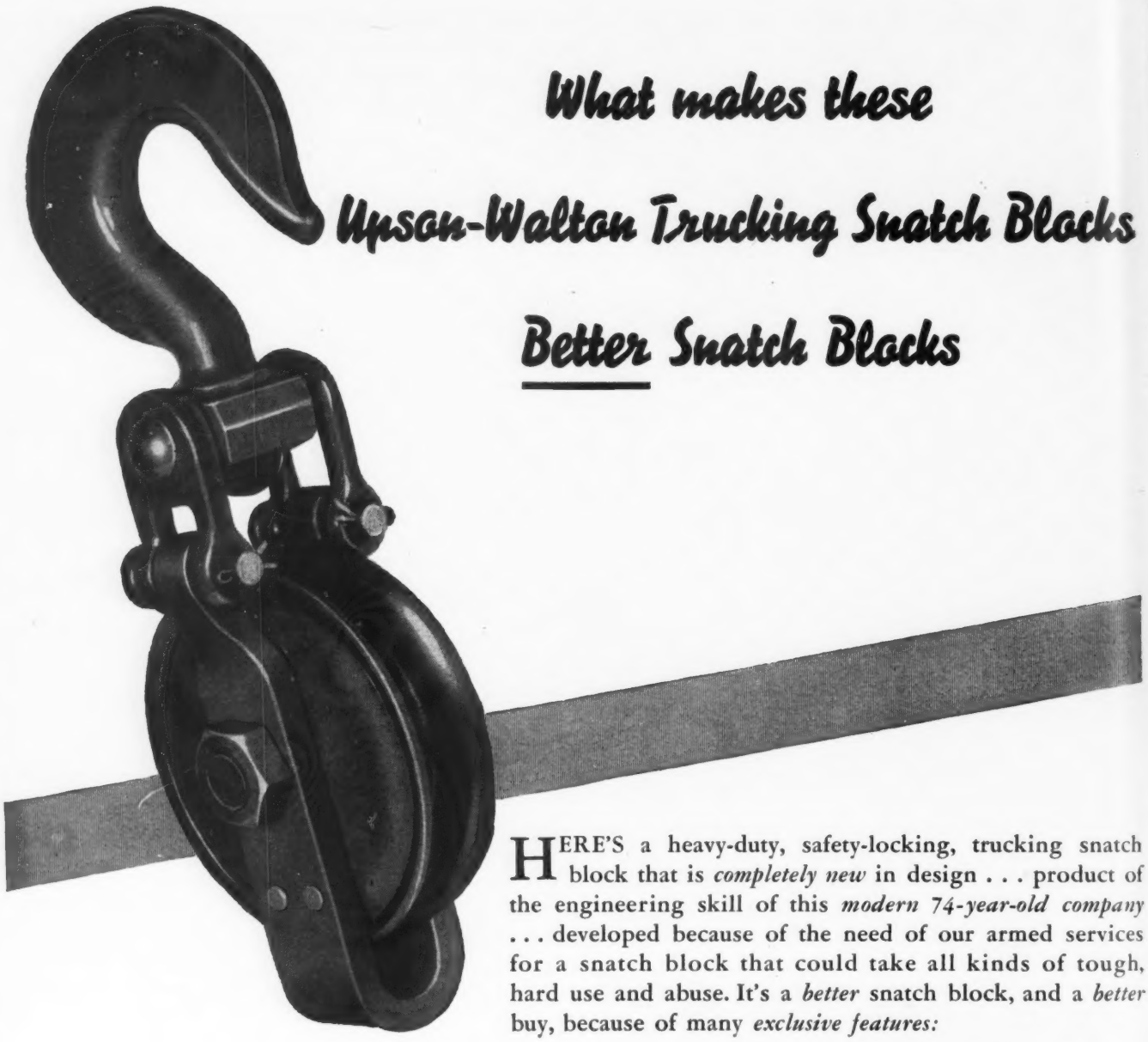
• Satisfactory service in other fields doesn't mean that a piece of equipment will be equally satisfactory in the Coal Mining Industry. The coal mine is no place for equipment that needs to be "coddled" and "babied".

Cantrell compressors were born and bred in the coal mines. They are engineered exclusively to meet the service requirements of coal mines. "Gingerbread" gadgets and fancy frills are not included to sell the Cantrell. Ruggedness, stability, faithful, constant service, when and where you want it, is built into the Cantrell, and, at a price that every coal mine can well afford to have two or more Cantrell compressors on hand at strategic points for immediate service at all times.

The Cantrell Type OMC, shown above, is a machine for mines preferring to pull the compressor in regular trips of cars or with an extra locomotive. Its capacity is ample to take care of any mine requirement . . . and it has what it takes to render service under the most severe operating conditions. Write for complete information to Imperial Bronze Manufacturing Co., Jellico, Tennessee.

Cantrell
COMPRESSORS

What makes these Upson-Walton Trucking Snatch Blocks Better Snatch Blocks



HERE'S a heavy-duty, safety-locking, trucking snatch block that is *completely new* in design . . . product of the engineering skill of this *modern 74-year-old company* . . . developed because of the need of our armed services for a snatch block that could take all kinds of tough, hard use and abuse. It's a *better* snatch block, and a *better* buy, because of many *exclusive features:*

EXTRA HEAVY FORGED STEEL SHELL PLATES: recessed for sheave to prevent jamming of rope. Rope positively cannot work in between shell plate and sheave. Lateral or offset pulls will not spring or bend the shell plate.

NEW DESIGN SWIVEL HOIST HOOK: extra heavy construction, drop-forged steel; provides a greater safety factor.

EXTRA HEAVY ONE-PIECE STRAP with forged eye connections. Strap and shell plates are riveted securely together.

EXTRA HEAVY CROSSHEADS, swivel links, safety links and pins.

HEAVY DUTY CAST STEEL SHEAVE: longer wearing. Heavy sections in tread and flanges of sheave—rope cannot wear through.

LARGE CENTER PIN: pressure alemite fitting is recessed into the center pin for easy lubrication.

STEEL SLEEVE OVER CENTER PIN materially increases bearing diameter, insuring longer life.

HEAVY BRONZE BEARING, pressure alemite lubricated.

AS WE GO TO PRESS, DELIVERIES ON UPSON-WALTON TRUCKING SNATCH BLOCKS ARE GOOD

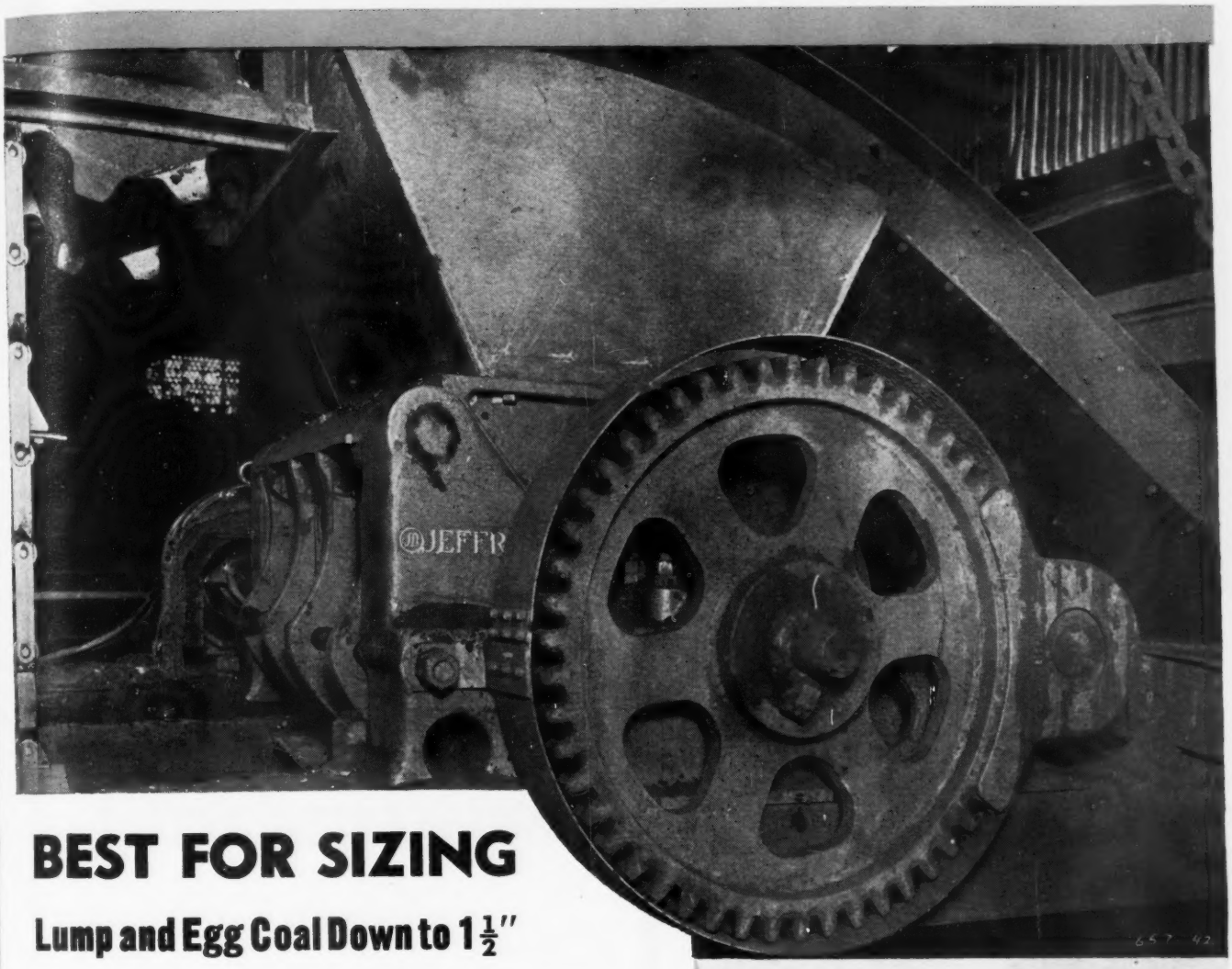
U-W

Established 1871

THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

NEW YORK • PITTSBURGH • CLEVELAND • BUFFALO • CHICAGO



BEST FOR SIZING

Lump and Egg Coal Down to 1½"

If your lump coal becomes slow-moving, convert to stoker size in one reduction with a minimum of fines. Jeffrey crushers turn potential loss into actual profits by enabling you to send to market the sizes that are wanted, when they are wanted.

The Jeffrey Single Roll Crusher is a stand-by after many years in the production of sized coal for public utilities and domestic use. It meets the stiffest preparation specifications . . . because Jeffrey engineers keep close watch on coal market trends and are in a position to help you satisfy each new demand in a practical manner.

More Than 50 Years of Experience

Jeffrey

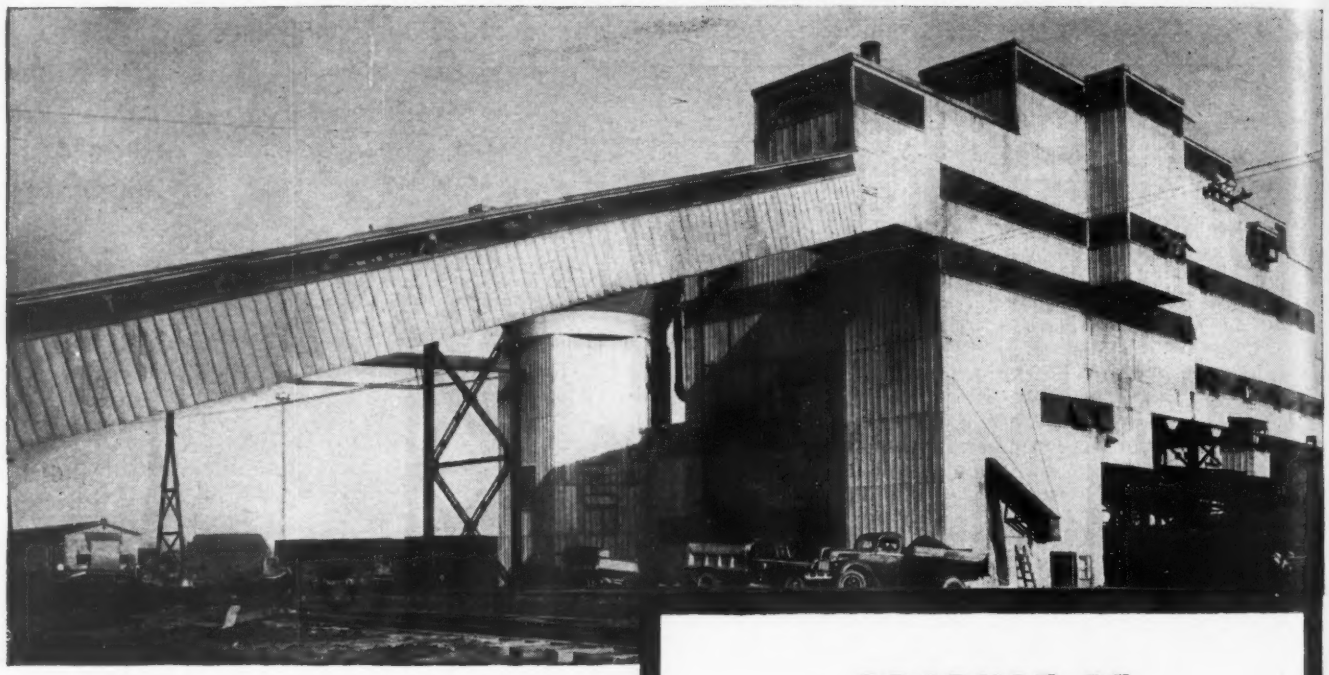
SINGLE ROLL CRUSHER

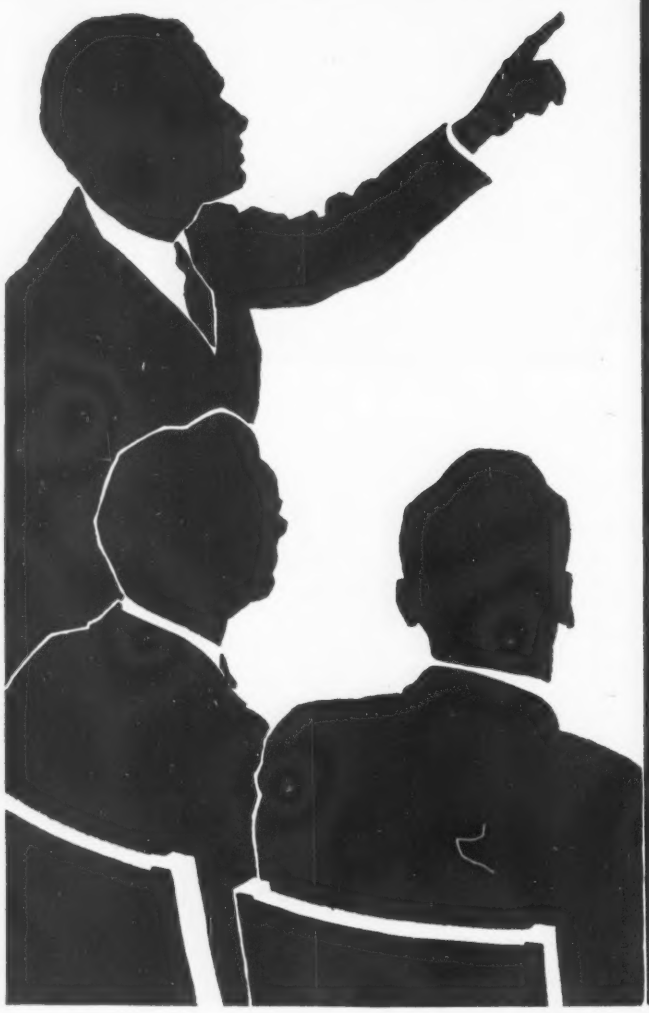
THE JEFFREY MANUFACTURING COMPANY

(Established in 1877)

912-99 North Fourth Street, Columbus 16, Ohio

Baltimore 1	Buffalo 2	Cleveland 13	Houston 5	New York 7	St. Louis 3
Birmingham 3	Chicago 1	Denver 2	Huntington 19	Philadelphia 3	Salt Lake City 1
Boston 16	Cincinnati 2	Detroit 13	Milwaukee 11	Pittsburgh 22	Scranton 3
		Harlan			





PRODUCT OF

COORDINATED

ENGINEERING SKILLS

When it comes to designing and building belt conveyors, we see ourselves as one member of a three-way team. For three distinctive techniques are necessary to insure maximum conveyor efficiency: that of the engineers who plan and operate the property: that of the men who design and build mechanical conveyor equipment; that of the rubber belting technicians—who call upon their scientific knowledge of compounding, their experience in methods of belt design and manufacture. All three groups must work in close cooperation; all three have contributed to the successful performance of thousands of installations where U. S. Rubber Conveyor Belts are now in service.

SERVING THROUGH SCIENCE *WITH ENGINEERED RUBBER CONVEYOR BELTS*

UNITED STATES RUBBER COMPANY

1230 Sixth Avenue • Rockefeller Center • New York 20, N. Y. • *In Canada:* Dominion Rubber Co., Ltd.

The loader with the natural, smooth, easy, shovel-action loading head.

IF YOU ARE INTERESTED IN MECHANICAL LOADERS—

● When buying equipment as vital to mining as mechanical loaders you want to know who and what is back of the machine you choose.

For over thirty-seven years Myers-Whaley have been doing one, and only one, job—that of building mechanical loaders. Our engineers have devoted their time and effort exclusively to mechanical loading problems of mining since 1908. It was then that Myers-Whaley installed the first commercially successful loading machine in the coal industry.

From the beginning our constant purpose has been to do a better job of mechanical loading. Through these years of concentrated experience many great improvements, of course, have been made in our machines.

Today, the Whaley "Automat" is recognized as a machine with important advantages not to be had in any other make. Advantages that have been thoroughly tried and proved satisfactory in meeting the service requirements of greater production at lowest cost.

If you are interested in mechanical loaders, you are interested in the "Automat" and the experience behind this machine. If you are planning the installation of loaders within the next 24 months, write to us now giving us information on your mining conditions. Myers-Whaley Company, Knoxville 6, Tennessee.

MECHANICAL LOADERS EXCLUSIVELY FOR OVER 37 YEARS

Lay-Set is pre

● When you put Hazard **LAY-SET** **PREFORMED** on your machine, you install a wire rope that is ready to start work. You don't have to "baby" it. The preforming process sets each wire and strand at complete ease and relaxes the steel. That's why **LAY-SET** can work hard from the word GO! More than this, **LAY-SET** **PREFORMED** is easier and faster to install and safer to handle. It lasts longer, therefore gives greater dollar-value.

●

HAZARD WIRE ROPE DIVISION

WILKES-BARRE, PA.
ATLANTA
CHICAGO
DENVER
FORT WORTH
LOS ANGELES
NEW YORK
PHILADELPHIA
PITTSBURGH
PORTLAND
SAN FRANCISCO
TACOMA

AMERICAN CHAIN & CABLE
BRIDGEPORT

ARMY E NAVY

HAZARD LAY-SE Pref

RECORDS EFFECT SAVINGS IN TIME, MONEY and ACCIDENTS

W. H. (Bill) Brokaw Tells How Record-keeping Pays

"Safety is a full-time job," I once read somewhere and I agree. But I'd like to add that no matter how much time a machine operator spends on a safety campaign, he needs a few of the right sort of reminders now and then.

"Not long ago I was on a rush job at an Army air base. We were trying to meet a deadline and didn't wait for wire rope replacements which were on the way. We used about 3,000 feet of wire rope on the job, of the ordinary type and most of it rope which had already been retired. As a result, seven or eight cases of infection developed from snagged hands, and one break resulted in a leg injury. Since most of the men were in the habit of working with preformed rope which didn't snag, they were too late in learning how to handle the old rope to avoid injury.

"An honest estimate of the time lost because of the accidents which could have been avoided by waiting for the new preformed cable would be far greater than the hours of lay-up, had we stopped and waited for deliveries.

Reminder System

"I have a system which will not allow me to forget things like that. I keep a daily diary, in which I record all operation faults. But that's not all. Once a week I go over my record and check such cases and study them. And when I have the chance I discuss with others how they could have been avoided.

"Some operators tell me that they can remember all they want to remember about accidents. But I can't. Unless I study my record and look for better methods whereby I can correct my errors, I find that I soon forget about all but the 'slick' jobs where there were no accidents or faults. The lesson I should have learned is gone, and with it the picture of what happened and what could be done another time to avoid a 'repeat'."

EXPLOSIVES Are Tools . . .

The Right Choice . . . Properly Handled . . . Gets the Most From the Job

Picking an explosive is like choosing the right tool from the kit—both call for a consideration of job requirements.

Atlas makes over 120 kinds and grades of explosives, many of them in different sizes and types of packing.

From them, you will find the right grade to fit *your* requirements for Strength . . . Velocity . . . Heaving Power . . . Water Resistance . . . Fume Qualities . . . Permissibility.

You'll find the right tool for more profitable blasting in the Atlas kit of explosives.

ATLAS HIGH EXPLOSIVES

AMMONIA DYNAMITES

HIGH DENSITY

- **EXTRAS** — Str. 15%-60% Vel. 7300-12,000 Den. 105
- **APEX** — Str. 20%-70% Vel. 9000-19,000 Den. 115
- **Stumping Expl.** — Str. 15%-50% Vel. 7800 Den. 103-117

FREE FLOWING

- **FLO-DYNS** — Str. 10%-65% Vel. 4600-5400 Bag Packed
- **Quarry Specials** — Str. 20%-65% Vel. 4000-5500 Bag Packed

LOW DENSITY

- **AMODYNS** — Str. 65% Vel. 5800-10,000 Den. 118-173
- **Stumping Expl.** — Str. 30%-65% Vel. 7400-9000 Den. 133-165
- **APCODYNS** — Str. 65% Vel. 7000-9000 Den. 128-180

PERMISSIBLE

- **COALITES** — Str. 55%-60% Vel. 6000-10,000 Den. 133-244
- **APCOLS** — Str. 60% Vel. 4500-7000 Den. 133-178

NITROGLYCERINE DYNAMITES

- **FARMEX Ditch.** — Str. 50% Vel. 18,000 Den. 103-108
- **Nitroglycerine Dyn.** — Str. 20%-60% Vel. 8800-19,000 Den. 105

GELATINS

PERMISSIBLE

- **GEL-COALITES** — Str. 35%-60% Vel. 8200-16,400 Den. 97-107

AMMONIA

- **GIANT** — Str. 30%-90% Vel. 7000-20,000 Den. 85-100
- **PETROGEL** — Str. 60% Vel. 18,000 Large Cartridges

NITROGLYCERINE

- **ATLAS** — Str. 20%-100% Vel. 6500-20,000 Den. 85-100
- **Blasting Gel.** — Str. 100% Vel. 20,000 Large Cartridges
- **Oil Well Expl.** — Str. 80%-100% Vel. 20,000 Large Cartridges
- **PETROGEL H. V.** — Str. 60%-100% Vel.18,000-20,000 Large Cartridges

SEMI-GELATINS

PERMISSIBLE

- **GEL-COALITES** — Str. 55%-60% Vel. 5900-12,000 Den. 120

AMMONIA

- **GELODYNS** — Str. 65% Vel.10,000-11,000 Den. 110-128

Str. % Strength.
Vel. Velocity of detonation, feet per second, in the open 1¼" x 8".
Den. Minimum number 1¼" x 8" cartridges per 50-lb. case.

• *There is profit in the right explosive* •

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY

WILMINGTON 99, DELAWARE

Offices in Principal Cities

Industrial Explosives • Industrial Finishes • Coated Fabrics • Acids
Activated Carbons • Industrial Chemicals • Ordnance Materiel

burie
ago...
HAZARD SUBMARINE INSULATION
JUTE CUSHION TAPE
CORE-TAPE
PLASTIC ASPHALTUM SEALING COMPOUND
COPPER CONDUCTORS
PLASTIC ASPHALTUM SEALING COMPOUND
WEATHERPROOFED TAPE COVERING ON EACH CONDUCTOR
ASPHALTUM COATED OUTER TAPE WITH FLAKE MICA FINISH
HEAVY NON-METALLIC ARMORTITE TAPE
Not affected by heat or cold within a range of −10°F. to +120°F.

. . . but still very much alive

Hazard Armortite Power Cables, first made and sold in 1927, are still at work, lying buried in their original trenches in many installations thoughout the country.

ARMORTITE Cable is protected from moisture and acid soil conditions by layer on layer of extra tough, resilient insulation, braids, and non-metallic tapes. Through 18 years these cables have given satisfactory service with every indication of long life to come.

For mine power distribution, Armortite Cable offers a low-cost, reliable solution because you can bury it directly in the ground out of harm's way.

You'll save on maintenance too. More details in Armortite Bulletin. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

HAZARD

3913

insulated wires and cables for every mining use

CARDOX

THE NON-EXPLOSIVE MINING METHOD

THESE 136 OPERATORS

Are Now Using

THE NON-EXPLOSIVE MINING METHOD

WEST VIRGINIA

Algoma Coal and Coke Company
American Coal Company.....(3)*
Ames Mining Company
Bethlehem Fairmont Coal Company.....(2)
Brule Smokeless Coal Company
Canyon Coal and Coke Company
Clear Creek Coal Company
Crab Orchard Improvement Company.....(2)
Crystal Block Coal & Coke Company
Crystal Block Mining Company
Detroit Mining Company
Elk River Coal and Lumber Company
Gay Mining Company
Gulf Mining Company
Hutchinson Coal Company
Imperial Smokeless Coal Company.....(2)
Jacobs Fork Pocahontas Coal Company.....(2)
Jamison Coal and Coke Company.....(3)
Katherine Coal Mining Company
Koppers Coal Div., Eastern Gas &
Fuel Associates.....(2)
Mary Frances Coal Company
Minds Coal Mining Corporation.....(2)
Monongahela Rail and River Coal Corporation
Pardee and Curtin Lumber Company.....(5)
Peabody Coal Company
Pecks Run Coal Company
Premier Pocahontas Collieries Company
Princess Dorothy Coal Company
Pursglove Coal Mining Company.....(2)
Raine Lumber and Coal Company
Raleigh-Wyoming Mining Company.....(3)
Red Jacket Coal Corporation
Scotia Coal and Coke Company
Slab Fork Coal Company
South Side Company
Standard Fire Creek Coal Company
Truax-Traer Coal Company
Turkey Gap Coal and Coke Company
United Pocahontas Coal Company
Upland Coal and Coke Company
West Virginia Coal and Coke Corporation.(2)
Weyanoke Coal and Coke Company.....(2)
Winding Gulf Collieries
Wood Coal Company

VIRGINIA

Buchanan County Coal Corporation.....(2)
Coal Processing Corporation
Gibson Fuel Company
Jewell Ridge Coal Corporation.....(2)
Page Pocahontas Coal Corporation.....(2)
Red Jacket Coal Corporation
Sycamore Coal Corporation

KENTUCKY

Bell Coal Company
Big Jim Coal Company
Blue Bird Mining Company
Cinderella Coal Corporation
Creech Coal Company
W. G. Duncan Coal Company.....
Elkhorn Coal Company
Hart Coal Company
Harvey Coal Corporation
The Kenmont Coal Company
Knott Coal Corporation
Morris Brothers Coal Company
Republic Steel Corporation
Shearn Coal Company
Stoker Coal Company
Utilities Elkhorn Coal Company.....

*INDICATES NUMBER OF MINES USING CARDOX METHOD

CARDOX CORPORATION

ANNUAL *Roll Call*

PENNSYLVANIA

Butler Consolidated Coal Company
Consolidation Coal Company
Moffit Coal Company
Pittsburgh Coal Company.....(6)
Edward Tomajko
Westmoreland Coal Company.....(2)

OHIO

Hanna Coal Company of Ohio.....(3)
Midvale Coal Company
Mine No. 6 Inc.
Warner Collieries Company.....(2)

ILLINOIS

Bell and Zoller Coal and Mining Co.....(2)
Blue Bird Coal Company
Consolidated Coal Company
Dering Coal Company
Franklin County Coal Corporation
New Coal Company.....(5)
Old Ben Coal Corporation
Peabody Coal Company.....(2)
Sahara Coal Company
Thermal Coal Company
Truax Traer Coal Company

INDIANA

Evansville Coals Inc.
Glendora Coal Company
Ingle Coal Corp.
Knox Consolidated Coal Corporation.....(3)
Pyramid Coal Corporation
Standard Coal Company

IOWA

Shuler Coal Company

OKLAHOMA

Buck Creek Mining Company
Premium Smokeless Coal Company

TENNESSEE

Block Coal and Coke Company

COLORADO

Black Diamond Fuel Company
Boulder Valley Coal Company.....(3)
Canon Black Diamond Coal Company
Canon Monarch Coal Company.....(2)
Canon National Coal Company
Clayton Coal Company.....(2)
Colorado Fuel & Iron Corporation.....(3)
Consolidated Coal & Coke Company
Crested Butte Coal Company
Crow Bar Coal Company
Domestic Coal Company
Double Dick Coal Company
Giuliano and Sons Coal Company
Graden Coal Company
Griffith Coal Mining Company
Imperial Coal Company
Liley & Merlino
Louisville Lafayette Coal Co.
McNeil Coal Corporation.....(2)
National Fuel Company
Nu-Shaft Canon Coal Company
Oliver Coal Company.....(2)
Rocky Mountain Fuel Company
Royal Gorge Coal Company.....(2)
William E. Russell Coal Company
Shamrock Coal Company
Vento Coal Company.....(2)
Victor-American Fuel Company

WYOMING

Colony Coal Company
Rock Springs Fuel Company
Sheridan-Wyoming Coal Company.....(2)

UTAH

Uta-Carbon Coal Company

CANADA

Atlas Coal Company, Limited
Lethbridge Collieries, Limited
The Monarch Coal Mining Company, Limited
Red Deer Valley Coal Company, Limited
West Canadian Collieries, Limited
Western Gem & Jewel Collieries, Limited

CARDOX
HARDSOCG
DRILLING EQUIPMENT
Complete line of drilling equipment designed to give you the maximum in drilling efficiency.

· BELL BUILDING · CHICAGO

FLOCKER uses this exclusive process

. . . to give you *better brattice cloth*

Flocker Moropa Brattice Cloth offers greater resistance to fire and mildew . . . stays clean longer and, under identical conditions, outwears the ordinary product.

PROVED SUPERIORITY IN COTTON OR JUTE!

SUPERIOR FIRE-RESISTANCE—Protection lasts almost indefinitely, since chemicals are so thoroughly impregnated that they do not readily leach out.

SUPERIOR MILDEW REPELLENCE—Chemicals used do not absorb excessive moisture and fabric remains relatively dry and repellent to mildew.

STAYS CLEAN—Does not collect mildew "whiskers"—hence no slimy dirt.

LONGER SERVICE—Can be used and re-used over and over again. Absence of slime eliminates objections to recovery—men will co-operate in maintaining this Brattice Cloth which so vastly improves their working conditions.

This all-around superiority is achieved through an exclusive chemical process applied to either Jute or Cotton. The fabric is first saturated with special chemicals, then "can-dried"—a process adapted from the textile field—which thoroughly impregnates and bakes fire and mildew resisting properties into every fiber of the material.

And yet, in spite of its superior qualities, Flocker Moropa Jute Brattice Cloth costs you no more than ordinary Brattice Cloth . . . and prices are only slightly higher on Cotton. In reality, substantial savings can be realized on the use of either type.

If you're interested in the advantages this better Brattice Cloth affords, write for detailed information and quotations.

JOHN FLOCKER AND COMPANY

644 GRANT STREET, PITTSBURGH 30, PA.

Since 1822, Ropes, Slings, Nets and Cordage Fittings, Tackles, Waxed and Unwaxed Linen . . . Specialists in Cordage Problems . . . Wire Rope

The LIFELINE of the Mine

"This cable's got everything it takes to stand rough treatment," says Romey.*

*Copr. 1945 RCC

Long life, as measured by months of trouble-free service on the toughest job in the mine, is built into every inch of Rome "60-38" Single Conductor Locomotive Gathering Cable.

The ideal Locomotive Cable with complete adhesion between copper conductor and the insulation. It is protected overall with a tough Neoprene jacket. This cable is recommended for electric locomotives of the gathering reel type or any other service requiring a flexible, heavy duty portable cable, where extreme adhesion of the insulation to the conductor is desired.

THE CONDUCTOR is composed of rope stranded, tinned copper wires. The individual ropes are laid up in a special manner to resist both tension and torsion.

A SPECIAL INSULATION is used, which has high electrical qualities and extreme adhesion to copper conductor, which prevents separation of the conductor from the jacket.

HEAVY TWINE REINFORCEMENT CORDS are applied over insulation to strengthen the cable and control adhesion between insulation and jacket.

THE NEOPRENE JACKET is vulcanized in continuous lead molds and has a high tensile strength, maximum resistance to tearing and abrasion, and long aging characteristics.

FROM BAR TO FINISHED WIRE

ROME CABLE
CORPORATION
ROME • NEW YORK

Saturday, January 27th, at 8:30 P. M. E.W.T.)

ALLIS-CHALMERS Salutes the

COAL INDUSTRY

—Pays tribute to the Men and Women of this great industry on the famous

BOSTON SYMPHONY

Saturday Night Radio Program

TUNE IN THIS TRIBUTE. Listen and be proud as a nation-wide network of 189 radio stations tells America of your industry's great contribution to the war effort . . . the production records you and your associates have helped to set, the many ways your industry is helping to speed Victory! It's a salute to you . . . to every man and woman working in America's great Coal Industry. Don't miss it!

Check Your Local Paper for Time and Station

ALLIS-CHAL

(E.W.T.) over 189 stations of the Blue Network

THE WORLD'S FINEST ORCHESTRA—*Conducted by Serge Koussevitzky*

Again this year—Allis-Chalmers dedicates these Saturday Night Boston Symphony Concerts *to the men and women of U.S. Science and Industry.* We believe the "world's finest music played by the world's finest orchestra" is the ideal tribute to those who are doing so much to further American Good Living—so much to protect it!

ALLIS-CHALMERS

"Engineering That Aids All Industry Furthers American Good Living"

IT'S IN THE RECORDS!

MARION *Achievements* ARE RECORDED IN THE "BLUE BOOK" OF THE COAL STRIPPING INDUSTRY

Your Name appears in The "Blue Book" when MARION helps you with your Coal Stripping Problem

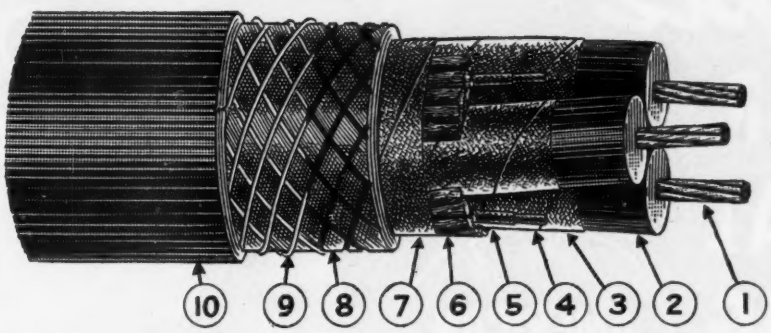
THE

MARION

STEAM SHOVEL COMPANY • MARION, OHIO

SHOVELS • DRAGLINES • WALKERS • *3/4 cu. yd. to 35 cu. yds.*

Performance Records Prove Simplex-Tirex Quality



1 Power Cond.
2 Insulation
3 Tape
4 Ground Cond.
5 Braid
6 Filling
7 Tape or Binders
8 Inner Jacket
9 Seine Twine
10 Outer Jacket

Simplex - Tirex Type G

If you could watch the manufacture of TIREX Cords and Cables, follow them step by step, process by process through our plant, you would clearly understand why they are so good. From the small copper wires that make up the flexible conductor right through to the smooth, tough, abrasion resistant rubber sheath, they are designed for hard service. Each is as good as we can make it and performance records furnish abundant evidence that there are none better.

Type W - without ground wires.
Type G - with ground wires.
Type SH-A - without ground wires, shielding over each conductor.
Type SH-B - without ground wires, shielding over cabled conductors.
Type SH-C - with ground wires, shielding over cabled conductors.
Type SH-D - with ground wires, shielding over each conductor.

A small TIREX cord for a portable tool is made with the same care and precision as a TIREX cable for a mammoth shovel or dredge. Careful selection of materials, skilled workmanship, frequent inspections and tests, these all lead up to a finished product from which it is reasonable to expect trouble-free service.

If you need an electric cord or cable where flexibility, electrical stability and abrasion resistance are important you can trust TIREX. The satisfactory service that TIREX rubber sheathed cords and cables have rendered to mines, quarries, shipyards, railroads and industry of every sort during the past twenty-five years is ample evidence that they will not let you down now.

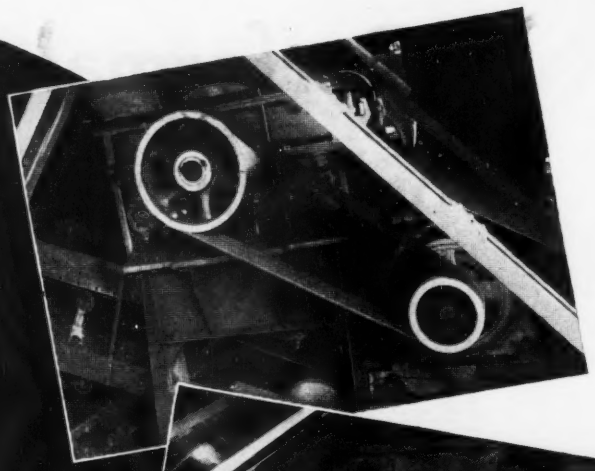
Simplex Wire & Cable Co., 79 Sidney Street, Cambridge 39, Mass.

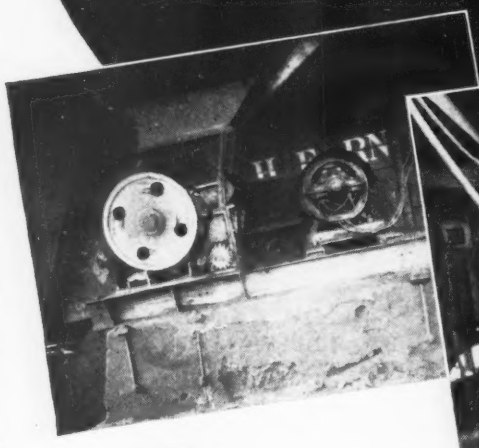
ARMY E NAVY
M★★★

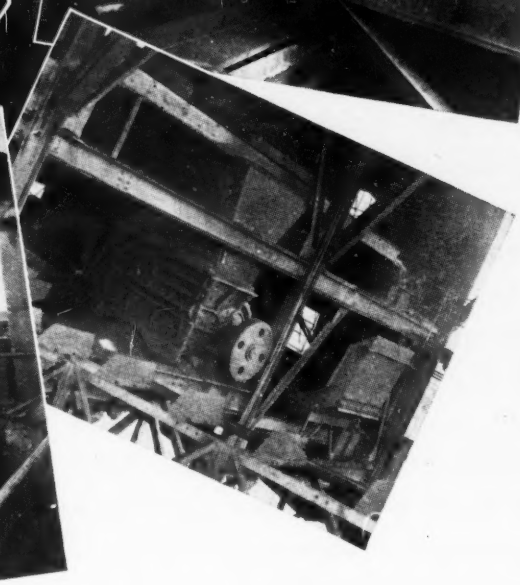
Simplex
WIRES and CABLES

THE *Simple* ANSWER TO ANY COAL CRUSHING PROBLEM

AMERICAN ROLLING RING CRUSHERS







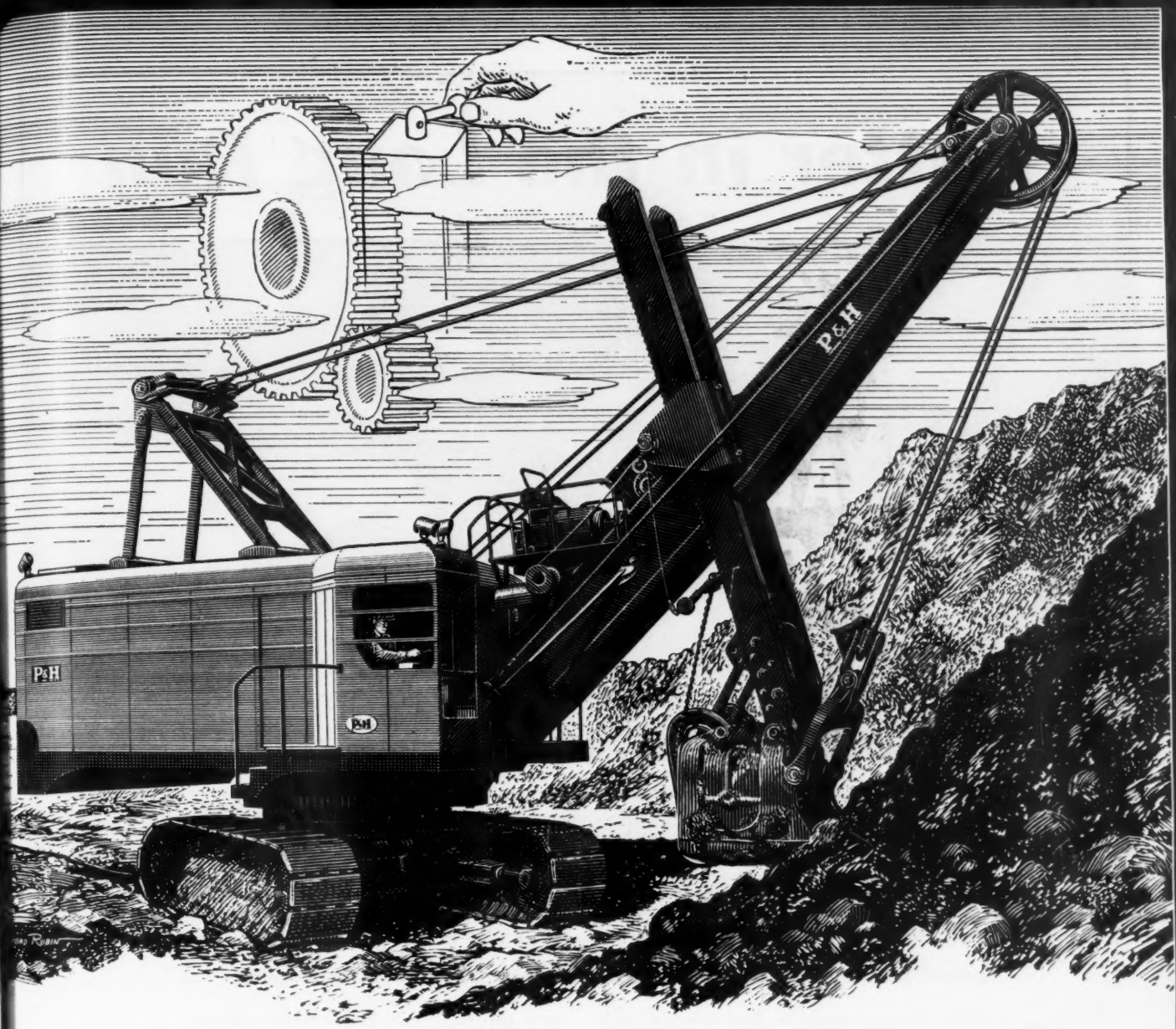
Patented reversible manganese steel SHREDDER RINGS are found only in the American Rolling Ring Crusher.

The Rings have twenty cutting edges or teeth and are designed to maintain their outward position by centrifugal force at specific speeds. In contact with solid metal the rings are momentarily deflected from their usual course because they are free to swing back out of position. No shear pins or other safety devices that require attention.

- **EXCEPTIONAL WIDE RANGE OF REDUCTION**
- **UNIFORMITY OF SIZE**
- **CRUSHES AT LESS THAN ONE CENT PER TON INCLUDING ALL COSTS**
- **EXTERNALLY ADJUSTABLE—EASILY ACCESSIBLE AND COMPACT**

★ Installations like those pictured here are daily demonstrating the many advantages of crushing coal to stoker size with the American Rolling Ring Crusher—the unit that fully measures up to the job and relieves you of problem after problem. You don't have to buy a standard type—the unit you require is fitted to your need so that you can be equipped for greater range of reduction and for tonnage desired. In one operation run-of-mine or lump coal is reduced to sizes for unit pulverizers and automatic stokers through the splitting action of the patented reversible manganese steel SHREDDER RINGS. Each crusher is sold on a definite guaranteed performance basis.

AMERICAN PULVERIZER COMPANY
1119 MACKLIND AVENUE
ST. LOUIS, 10, MISSOURI
ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS



We Switched Out The Trouble of Gear Shifting

Here is simplicity itself . . . absolute freedom from the mechanical complications of transferring power from one shovel motion to another.

Powered by its own heavy duty, shovel-type motor, the P&H propel machinery is completely independent of all hoisting and swinging motions. P&H's independent propel drive means simpler, easier move-ups . . . it means less trouble, less time out.

The change from dig to propel is instantaneous on a P&H Electric Shovel — accomplished by a mere flick of the master propel switch. Sliding gears and mechanical clutches with their complicated mechanisms are entirely eliminated — there is far more time for actual digging.

Here is another important advantage in the interests of lower tonnage costs for all kinds of open-pit operations. Behind it is P&H's 60-year leadership in applying electrical power to the movement of heavy loads.

P&H

ELECTRIC SHOVELS

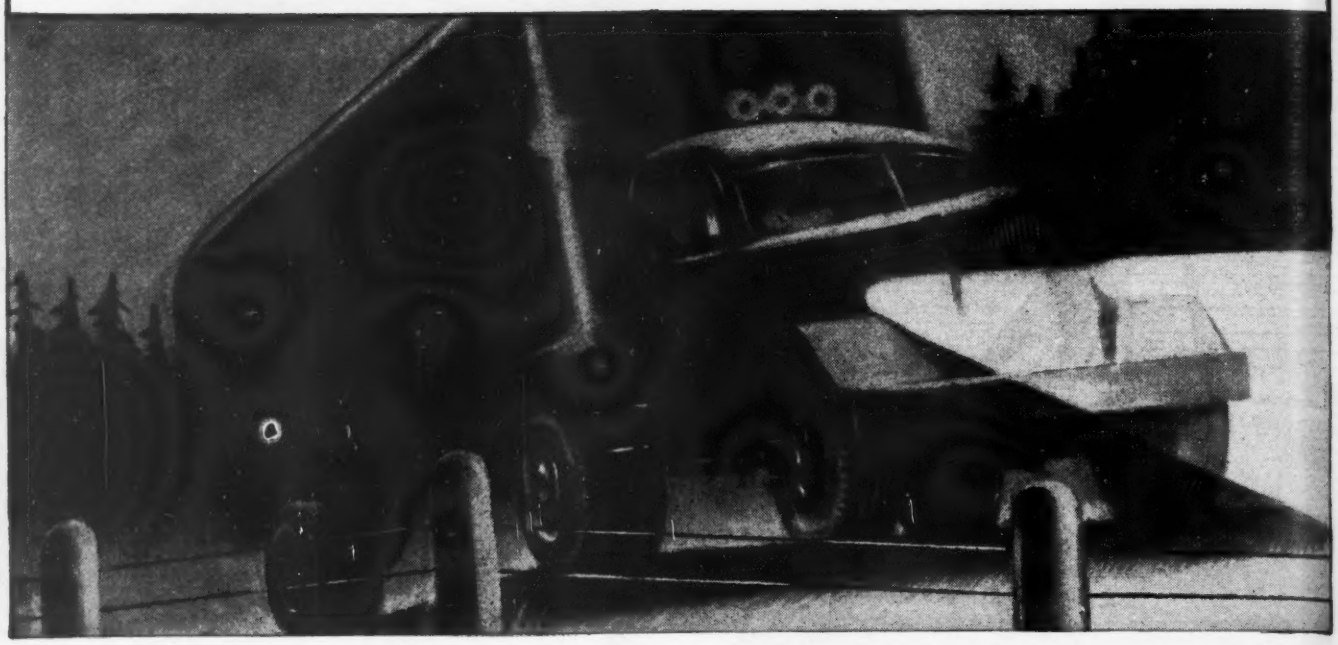
4540 West National Avenue
MILWAUKEE 14, WISCONSIN

HARNISCHFEGER CORPORATION

EXCAVATORS · ELECTRIC CRANES · ARC WELDERS · P&H · HOISTS · WELDING ELECTRODES · MOTORS

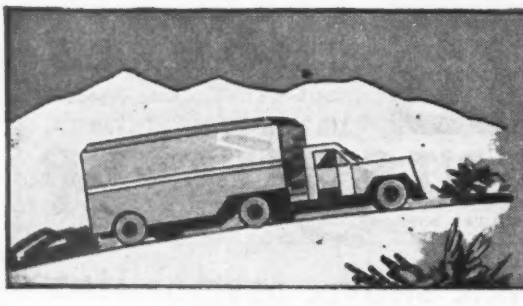
THE GREATEST FORWARD STEP EVER MADE IN ELECTRIC SHOVEL DEVELOPMENT

Better in the Long Run



In spite of prolonged shortages of vehicles, replacement parts and personnel, the motor truck transportation industry successfully has performed a tremendous task in supplying the nation's critical needs swiftly and economically. Now, a limited number of Ward LaFrance heavy-duty trucks for civilian use is available . . . trucks designed and engineered to respond quickly under all conditions and loads.

Our twenty-five years of truck manufacturing, plus the experience gained in producing specialized vehicles of war, enables us to build better civilian trucks capable of meeting every demand with reliability and low maintenance cost. Remember that, in the long run, trucks engineered to do a *specific* job do it better! Why not investigate by writing our Sales Department today?

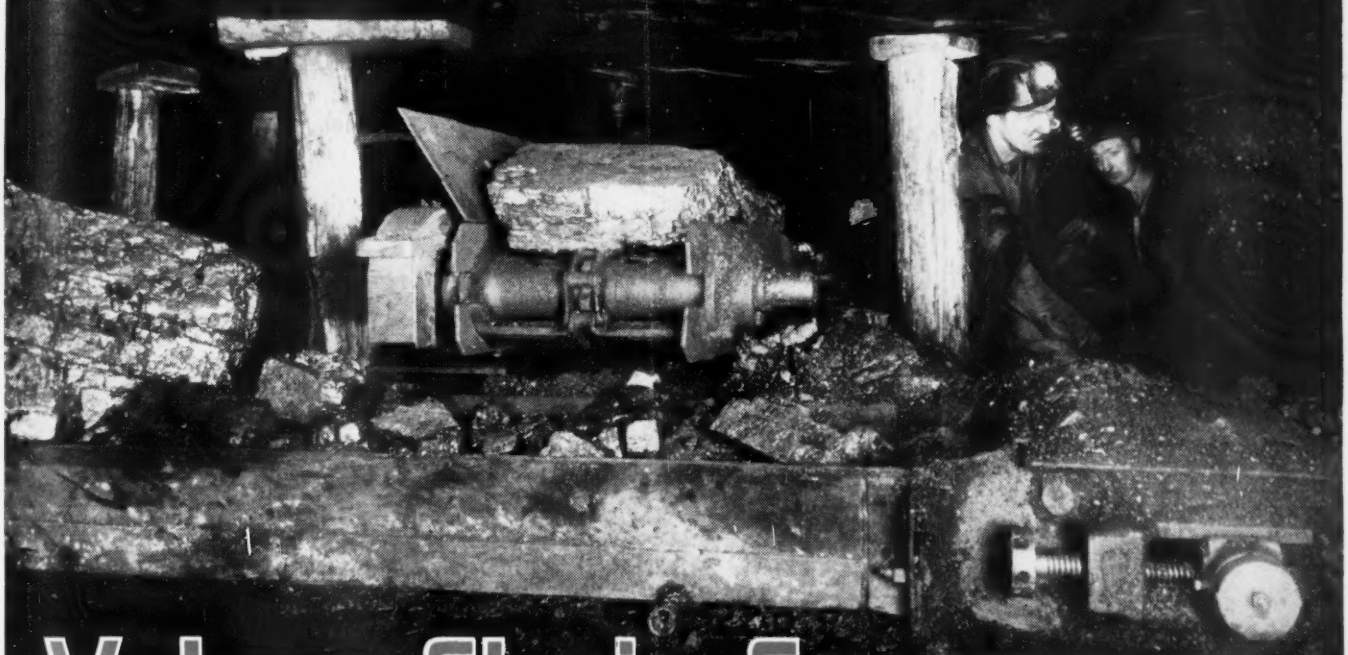


WARD LAFRANCE

TRUCK DIVISION

GREAT AMERICAN INDUSTRIES, INC. • ELMIRA, NEW YORK

"MIGHT BE A LITTLE OVERLOADED, BUT

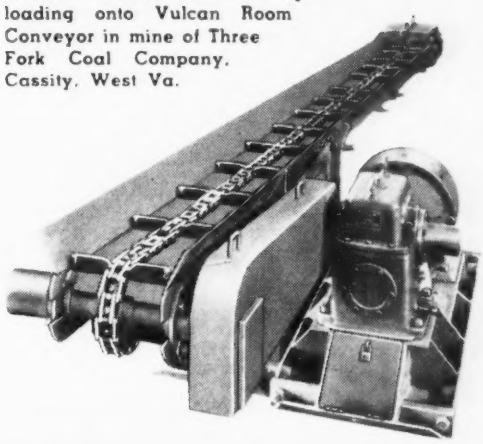


Vulcan Chain Conveyors
ARE BUILT TO TAKE IT"

WE don't recommend piling the coal up quite so heavily—even on a Vulcan Chain Conveyor—as the boys at the Three Fork Coal Company did when the photograph reproduced above was taken. But we know it often happens, so we build an extra margin of strength into every working part to take care of just such extra heavy loads. If anything MUST go it's usually the shear pin in the head sprocket, which can easily be replaced.

Write us regarding any requirement for underground conveyors—either Chain or Shaking Chute. We manufacture both types in a wide range of sizes, together with a complete line of Chutes, Rollers, Jacks and other modern accessories. Illustrated bulletins mailed promptly on request.

ABOVE: Vulcan Face Conveyor loading onto Vulcan Room Conveyor in mine of Three Fork Coal Company, Cassity, West Va.



VULCAN ROOM CONVEYOR with fully-enclosed speed-reducing drive unit and electric motor of any required type or size.

VULCAN IRON WORKS

Established 1849

Main Office and Works WILKES-BARRE, PA., New York Office 50 Church St.

Heavy-Duty Electric Hoists
Self-Contained Hoists
Scraper Hoists
Car-Spotting Hoists
Room Hoists

Shaking-Chute Conveyors
Chain Conveyors
Cast-Steel Sheaves and Gears
Cages, Skips and Gunboats
Coal-Preparation Equipment

Steam Locomotives
Diesel Locomotives
geared and electric drive
Gasoline Locomotives
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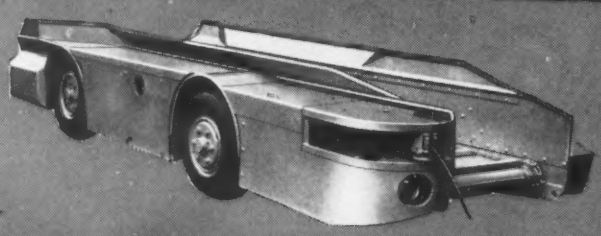

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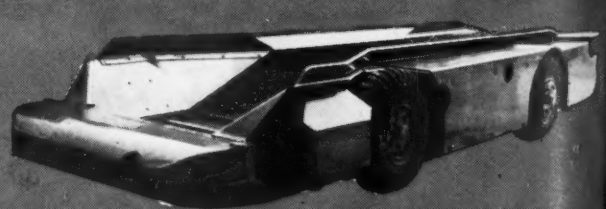

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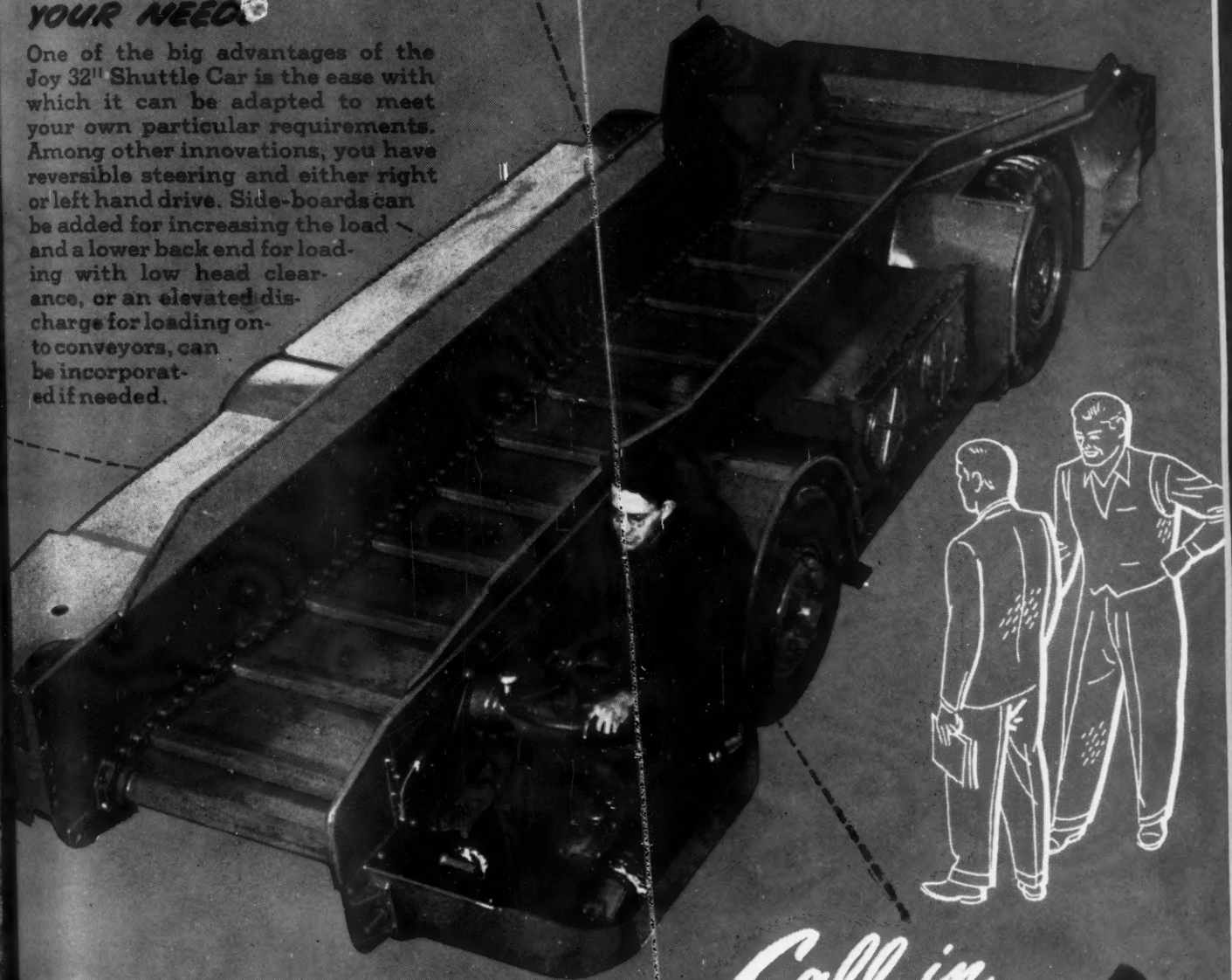

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Coal Age

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

Ivan A. Given, *Editor*

January, 1945

War Still Paramount

RECENT developments lead inescapably to the conclusion that the war will be longer rather than shorter. By the same token, coal must plan for a lengthier period of maximum production than might have been expected a few weeks ago. That production will come harder for a number of reasons, since the record-breaking tonnages of recent years have been made at the expense of a terrific beating for equipment and a substantial sacrifice in development work, not to mention the strain on a sharply reduced personnel.

Considering only personnel, the decline in number of mine workers seems likely to have far-reaching implications now as well as in the future. For one thing, it means that if miner working time is reduced to what might be termed "normal" in the future, coal's capacity to produce will be cut severely unless the working force can be built up or other steps taken. In fact, it appears possible that demand under such restrictions might equal or exceed producing capacity.

Getting additional men now is a rather remote possibility and the chances are that there will be additional losses rather than gains, complicating the problem now but enhancing coal's ability to give employment in the future. The manpower outlook also suggests strongly the relaxation of some of the more rigid provisions of wage agreements and the removal of other restrictions to provide the flexibility that may be necessary to meet present and future demands. And it reemphasizes the importance of accepted methods of promoting production and efficiency, such as: prevention of stoppages, reduction of absenteeism, maximum use of machinery and adoption to the hilt of efficient working methods, not only for the sake of cost and quality now and in the future but for the even more vital objective of maintaining war production.

No Greener Field

TWO MARKETS which coal cherishes as much as any others, perhaps, are the domestic and railroad. In these, also, competition is about as severe as any. In fighting this competition, coal has employed a number of weapons, the latest of which is research. The results, which include anthracite's new heater, improved stokers, even more efficient stoves, provide ground for concluding that competition will have tougher going.

The "iron horse" has become somewhat more of a problem child than the domestic market in recent years. The diesel, with glamor as not the least of its advantages, has given coal some real trouble and undoubtedly has more in reserve. But several recent developments provide some basis for believing that the future may not be unmitigated gloom.

One of the healthiest signs is the disposition of a number of leading railroads to explore to the end the possibilities of the coal-fired steam locomotive. At least three improved-type coal burners have been brought out in recent months, the latest a straight turbine unit. Then there is the nine-railroad program for the development of a turbo-electric locomotive with a special boiler fired with pulverized coal. Substantial support by bituminous operators through the industry's research organization figures in still another development—a proposal for joint operator-railroad research into the use of coal as a locomotive fuel. The sincere thanks of the industry go to those supporting this work. There should be no question, also, about joining in when the benefits in retention and expansion of one of coal's biggest markets are measured against the cost of the necessary research.

Well Done

COAL consumers have not had too many worries so far in this war, although that is not to infer that there are not a few tight spots and that these and others are not likely to get tighter. But consumers have fared pretty well to date because coal has come up with the tonnage—for example, some 620,000,000 bituminous and 65,000,000 anthracite in 1944.

This record reflects credit first of all on management and mine workers—the men on the firing line. It reflects credit on the manufacturers of mining equipment and supplies. And it reflects credit also on those men in government who have labored to keep coal in position to produce and to make sure that its output goes to the right places. A. S. Knoizen, for example, returns to mining equipment production with a real record of achievement in the Mining Division of WPB. Dr. C. J. Potter continues in SFA the work that has earned him equal praise from the coal-mining industry. To these men, their predecessors and their staffs, the coal industry, standing on its own record of achievement, renders a salute for a job well done.

Coal Stabilization:

GOVERNMENT'S OR INDUSTRY'S JOB?

Federal legislation leads the field in the coal stabilization sweepstakes but many operators like other entries. To round out the record, Coal Age summarizes in the following material some of the thinking on federal rule and possible alternatives

SOMEWHAT MORE than a year and half ago, in August, 1943, *Coal Age* wound up a study of stabilization in the coal industry generally and federal regulation in particular with this characterization of the Guffey Act: "It was handy and it was legal."

Proponents of a new coal act also point to handiness and legality, as well as to the fact that federal regulation marked a period of profitable operation for the bituminous industry. As one coal operator put it, the fact that the industry now has a few coins to play with should not blind it to the fact that the conditions which could generate another dive into red ink still have not been entirely eradicated and consequently that stabilization by an outside agency still is a necessity. Echoing the opinion of the majority of the industry, he declared that federal regulation of the type set up by the previous coal acts is the most practical method of achieving that stabilization.

While its supporters are confident that new legislation along the lines of the earlier coal acts will be passed by Congress, there still is no absolute assurance of this—or that any other type of measure will be adopted to help coal in its task of keeping on an even keel and earning reasonable returns for its stockholders and employees. Even aside from this consideration, a number of operators feel that coal should not accept federal regulation for what promises to be an indefinite period without first canvassing the alternatives thoroughly—all the way through to and including old-fashioned individual initiative and enterprise.

What are some of the alternatives suggested, in operation or otherwise? The number has been sharply reduced by increasingly strict application of anti-trust legislation by the federal courts. However, until World War II, for at least the duration, made its operation more academic than not, the anthracite industry was deriving considerable satisfaction from production control under State legislation—and expects a resumption of benefits when hostilities cease. The anthracite plan is based on predetermining the probable market, then matching production to it and pro-rating that tonnage among signatory members. The plan is simple and supplies (or supplied) just about enough control to provide a reasonable opportunity for a profit without thoroughgoing regimentation of the industry and a relatively rigid price set-up.

Circumstances Alter Cases

Why, it might be asked, could not the anthracite plan be applied in the bituminous industry? The answer is that legislation would have to be the same in all states, which is highly unlikely. Even if it could be passed in all states concerned at approximately the same time, there would be no assurance that tinkering would not get it out of balance almost immediately. The Federal Government also would be a factor, even though the concerted action would not be between corporations and individuals but between State agencies. Congress, the executive arm and the federal courts have given the commerce and other clauses of the Constitution an amazing stretch and in its drive to make the federal paramount to the State the New Deal does not hesitate to sweep aside State laws and State ideas.

An early stabilization proposal which made little progress for several obvious reasons was district amalgamations or mergers: in other words, making one big company out of many small ones. Books could be written—and have—about amalgamations and their pros and cons, but when a few big companies control the larger part of the production of a commodity the result almost inevitably is a high degree of price stabilization—and not necessarily, as a suspicious or publicity-seeking Department of Justice might infer or even charge outright, as a result of illegal cooperation or conspiracy.

The various reasons why district mergers are a rather remote possibility in the United States include the natural one of reluctance to lose identity—an understandable attitude in the minds of those whose organizations have held their own and made real contributions in the fields of lower cost, higher quality and improved service to consumers. But if this and other reasons make mergers of this type difficult, it is relatively easy, say advocates of this alternative, to take a related step—selling through a common agency representing enough of the district tonnage to exert an adequate stabilizing influence.

Stabilization Line-up

Major proposals for the stabilization of coal-mining operations seem to their supporters to stack up about as follows:

1. FEDERAL CONTROL — Favored by the majority in the bituminous industry because it is "handy and legal" and because of its record of profitable operation in the past; advantages held to more than offset drawbacks of government in business and possibility of expansion of control to other phases of operation as time goes on.

2. SALES AGENCIES—Held to provide sufficient control over marketing operations to insure reasonable stability without the inflexibility and regimentation of federal control; coal remains free of outside regulation and restrictions; sniping at agencies could be eliminated by statutory exemption similar to that accorded agricultural cooperatives under the Capper-Volstead and other acts.

3. INDIVIDUAL OPERATION—Prospects for operation on an individual basis seen as the best in many years as a result of good market outlook, possibility that there will be little or no overcapacity to produce and improvements in production techniques and merchandising methods.

Sales-Agency Stabilization

The sales-agency plan of cooperative action to improve competitive relationships and correct abuses was approved by the Supreme Court March 13, 1933. It followed a long series of Congressional acts permitting cooperative action in the marketing of agricultural products and in the view of many the court followed substantially the same reasoning in approving Appalachian Coals, Inc. as Congress did in providing agricultural producers with statutory exemption in cooperative ventures. In fact, the court definitely declared that the mere fact that there was no physical merger of properties was no sign that an organized group could not do the same things that a corporation resulting from a merger could do.

Boiled down, the court's findings in the Appalachian Coals case amounted to the following:

1. Participants in the formation of the agency were engaged in a fair and open endeavor to aid the industry in a measurable recovery from its plight.

2. The agency plan does not contemplate or involve price fixing although the tendency would be to stabilize prices and raise them to a higher level. Where, however, a cooperative group does not seek a monopoly it is not to be condemned for undue restraint of competition because its efforts to correct abuses may result in a change in market conditions.

3. There is no ground for holding participants' plan illegal because they have not combined their properties and have chosen to maintain their independent plants with the objective of facilitating, rather than limiting, production.

It may be assumed that one reason the court held that competition and production would be promoted is inherent in the fact that members retain their corporate identity and thus have a lively interest in maintaining their tonnage—an objective necessarily involving keeping prices comparable with those of their neighbors both within and without the agency, with those of producers in other fields and with those for competitive fuels and energies.

How, then, can the sales agency benefit members—and others in the same region? The answers given by sales-agency advocates include the following:

1. Price cutting is neither quick nor easy. No one salesman can stampede his company into cutting a price needlessly and in turn precipitating price cuts by competitors, with or without the pressure of the purchaser.

2. Better knowledge of market conditions promotes price stability, yet the organization is sufficiently flexible to meet competition when and where necessary. For example, if a customer of an agency member or members was offered a price cut by a non-agency competitor, the agency would know whether that said competitor could supply the customer's needs and if not could logically decide that the price should be maintained. After a few such experiences, the price cutter probably would arrive at the conclusion that he was sacrificing profits needlessly. At the same time, if conditions dictated, as in competing with gas and oil, the agency plan would provide the necessary flexibility for adjusting prices, even to the extent of temporary or limited sales below cost to meet such competition—a difficult procedure under statutory minimum prices.

To put the matter another way, the sales agency would be in much better position to give effect to the fact that no one producer can expect to supply all the needs of the market and that therefore the remaining ones need only to stand their ground to continue to make a profit on what they do sell while the man who cuts below cost goes broke eventually or sees the light. As one operator put it, backbone is the scarcest of all ingredients in coal selling and the sales agency goes far in supplying that deficiency.

3. Better knowledge of market trends permits closer adjustment of production by sizes and other characteristics and better planning of operations for most efficient production.

4. Balancing and exchange of orders for various grades and sizes prevents distress sales and dumping.

5. A closer approach to equalized running time is made possible by better distribution of orders. In the opinion of one sales-agency member who, however, favors Guffey-type legislation, equalization of running time between members is one of the major factors bearing on the success of the sales agency.

6. A greater opportunity for sharing in big-tonnage business is made available to member producers.

7. Market acceptance is improved by better advertising and sales promotion at a lower over-all cost.

8. Consumer satisfaction is pro-

moted by improved service in coal utilization.

9. Greater ability to initiate and support research benefits members by expanding markets.

10. Consulting service to producers raises quality and reduces cost of production.

The net result of these and other advantages of the sales agency, say its supporters, is a higher level of realization in line with the decision of the Supreme Court. In the words of a former A.C.I. president, speaking at the 1934 meeting of the National Coal Association:

"Before the agency was launched but after it had become known that it would be launched, the market at once stiffened and buyers became apprehensive of their ability to beat down prices. The man who sold got real support and stamina and prices went up. And when the first A.C.I. list came out, they went up again—but all the time applying moderation to domestic prices, if you will. And that affected the price of all coals in our area and later spread to other areas."

If discussion of the sales agency could end on whether or not it would be helpful to the industry, the verdict, say its advocates, would be simple. Properly organized, staffed and supported, it can provide undoubted benefits. However, there is a little more to it than that. In its decision in the A.C.I. case, the Supreme Court empowered the lower court to "set aside the decree and take further proceedings if future developments justify that course in the appropriate enforcement of the act."

In addition to the string kept on the agency plan by the court, the Department of Justice also has taken the stand that the A.C.I. decision is not now regarded as controlling because conditions have changed, and that any action of the agency that would tend to stabilize prices would be regarded as illegal. Lacking a trial of the issue, that contention remains an opinion only, which must be matched against the rather clear-cut finding of the court that action for the purpose of improving the industry's position, even though it may "affect" prices, can be legal although "price fixing" is not. The feeling of many is that the Supreme Court could come around to the Department of Justice view only by a radical reversal.

Reversal, however, is a contingency that would have to be considered in sales-agency operation and for that reason a number of its supporters propose legislation providing exemption similar to that afforded agricultural and fishing cooperatives by the Capper-Volstead and other acts of Congress. For example, the Natural Resources

Reinforcement for Sales Agencies

Pertinent sections of proposed legislation for reinforcing the sales-agency plan are reproduced in the following. This proposal would extend to producers of natural resources "the same ability to cooperate which Congress a number of years ago extended to farmers when it enacted the Capper-Volstead Act. While the draft of the bill is in tentative form only, the ideas contained in it have been approved by the Natural Resources Committee and by the board of directors of the Chamber of Commerce of the United States at meetings held in the spring of 1944."

Section 2. Kind of Agencies Authorized

Persons engaged in the production of natural-resource products may act together in cooperative associations, corporate or otherwise, with or without capital stock, cooperatively to market in interstate commerce natural-resource products at prices to be determined by agreement between their members or by such association or between such association and its members; and such associations may act as marketing agencies, may use as sub-agents the sales forces or sales agents of their producer members as well as the sales forces or agents of non-member producers in carrying on their marketing activities, and may make the agreements necessary for carrying on their activities; provided, however, that such associations are operated for the mutual benefit of the members thereof as such producers and conform to the following requirements:

First: That the association does not pay dividends on stock or membership capital in excess of 6 percent per annum;

Second: That the association shall not buy for resale or otherwise handle, the products of non-members;

Third: That all agreements between such cooperative association and its members or its sub-agents or between the members of such cooperative association concerning the manner of its operation shall be made in writing and within ..... days after their making ..... copies thereof shall be filed with the Secretary of Commerce at such places as he may from time to time by order direct; but it shall not be necessary for the association to file with the Secretary price lists issued from time to time nor individual contracts of sale or invoices, but such information shall be available for inspection by the agents of the Department at any time, and if the Secretary considers necessary, copies of such information as he may require shall be made and furnished;

Fourth: That such cooperative association shall furnish to the Secretary such other information and data as it may have in its possession relating to the manner and effect of its operations as the Secretary may from time to time by order require;

Fifth: That such cooperative association shall not enter into any agreement with any other association handling the same natural-resource product regarding price, production, or markets, provided that a producer of a natural-resource product may belong to two or more regional marketing associations if all his production of such natural-resource product in each region is handled by the association for that region.

Section 3. Restraint of Agencies

If the Secretary of Commerce shall have reason to believe that any such cooperative association monopolizes or restrains trade in interstate commerce in any natural-resource product to such an extent that the price thereof is unduly enhanced or the supply thereof

Committee of the Department of Commerce suggests enactment of a measure amending the anti-trust laws to permit operation of cooperative market agencies by producers of natural resources, including determination of prices by agreement. Pertinent sections of this suggested legislation are reproduced elsewhere in this discussion of stabilization proposals.

Under such legislation, the producers would be left almost entirely free to carry on their own stabilization work, subject only to current reporting to a government agency with power to intervene when it felt agency operations were tending toward monopoly or undue price increases. While ready to proceed on the merits of the original set-up, leading agency advocates are inclined to the belief that statutory exemption of the agricultural type would achieve best results with a minimum of inflexible regulation.

Non-Regulated Operation

Analysis of the stabilization picture in coal mining also requires consideration of a second alternative: operation without any type of federal control or support. In studying the implications of this contingency, several questions immediately arise, the first one being: Is it practicable from the standpoint of maintaining a realization that would permit fair wages to employees and fair returns to stockholders?

There are perhaps two major factors in successful operation on this basis. One might be termed material and the other psychological. The material includes several items, such as ability to increase productive efficiency and thereby ability to compete, as well as the capacity picture in coal mining. The psychological involves the industry's frame of mind in regard to price cutting.

Perhaps a look at the capacity picture might be the logical first step in a study of the prospects of operation without any form of control. If coal were to go to a seven-hour portal-to-portal shift tomorrow, bituminous production per man-shift in the immediate future probably would not exceed 5 tons per man because of the reduced time at the face. In anthracite, the output probably would not be over 2.6 per man-shift. If employment was not over 400,000 in bituminous and not over 75,000 in anthracite, and the miner's work year was limited to 250 days (50 weeks of five days each), annual capacities

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is unduly restricted by reason of such monopolization or restraint, or that such cooperative association has failed to comply with any one or more of the requirements contained in Section 2, he shall serve upon such association a complaint stating his charge in that respect, together with a notice of hearing specifying a place and a day not less than 30 days after the service thereof, and requiring the association to file not sooner than 20 days after such service an answer to such complaint. The evidence given at such hearing shall be reduced to writing and made a part of the record therein.

If upon such hearing the Secretary of Commerce shall be of the opinion that such association monopolizes or restrains trade in interstate commerce to such an extent that the price of any product handled by it is unduly enhanced or the supply thereof is unduly restricted by reason of such monopolization or restraint, or if he shall be of the opinion that any of the requirements contained in Section 2 have not been observed by the association, he shall issue and cause to be served upon the association an order reciting the facts found by him and directing such association to cease and desist from such monopolization or restraint of trade or to cease and desist from failure to observe the requirements contained in Section 2, as the case may be.

Upon the request of such association, or if such association fails or neglects for 30 days to obey such order, the Secretary of Commerce shall file in the district court in the judicial district in which such association has its principal place of business a certified copy of the order and of all the records in the proceeding together with a petition asking that the order be enforced, and shall give notice to the Attorney General and to said association of such filing.

Such district court shall thereupon have jurisdiction to enter a decree affirming, modifying or setting aside said order, or enter such other decree as the court may deem equitable, and may make rules as to pleading and proceedings to be had in considering such order. The place of trial may, for cause or by consent of parties, be changed as in other causes. The facts found by the Secretary of Commerce and recited or set forth in said order shall be *prima facie* evidence of such facts, but either party may adduce additional evidence. The Department of Justice shall have charge of the enforcement of such order. After the order is so filed in the district court and while it is pending for review therein, the court may issue a temporary writ of injunction forbidding such association from violating such order or any part thereof. The court may, upon conclusion of its hearing, enforce its decree by a permanent injunction.

Service of such complaint and of all notices may be made upon such association by service upon any officer or agent thereof engaged in carrying on its business, or upon any attorney authorized to appear in such proceeding for such association, and such service shall be binding upon such association, the officers and members thereof.

The orders of the district courts shall be subject to review by the circuit courts of appeal, and the orders of the circuit courts of appeal shall be subject to review by the Supreme Court in the manner provided by the Judicial Code.

Section 4. Anti-Trust Laws Waived

Any cooperative association conforming to the provisions of this statute shall not be subject to the prohibitions of Sections 1, 2, and 3 of Chapter 15 of the United States Code, unless and until a cease and desist order shall have been issued as provided in Section 3 hereof and then only to the extent provided in such order. The remedy provided by Section 3 hereof is exclusive; and all other remedies and penalties, civil and criminal, shall be inapplicable both before and after the issuance of a cease and desist order as provided in Section 3 hereof.

would be approximately as follows:

Bituminous, 500,000,000 tons.

Anthracite, 49,000,000 tons.

Since the war picture indicates the need for every possible pound of production for some time to come, the question of a return to a "normal" working schedule for the miner, and what that schedule would be, still is somewhat in the realm of speculation, along with the demand that coal will be called upon to meet. Many, however, feel that that demand probably will be not less than 500,000,000 tons for bituminous and 55,000,000 tons for anthracite for some time to come after hostilities cease. Assuming working arrangements and number of employees as previously set out, demand therefore would match or exceed capacity in the years immediately following the war, assuming also that other conditions continued substantially unchanged. With little or no overcapacity, it is argued that one of the prime conditions for a reasonable degree of market and price stability is met, although certain districts undoubtedly would be better off than others in this respect.

What About New Capacity?

Can new properties be opened again to result in a top-heavy capacity position, assuming men can be found? The answer, of course, is yes—with perhaps explanation and qualification. Where new operations provide advantages in cost or quality or replace worked-out pits, they undoubtedly will be opened—and should be—but events in the industry in late years would indicate that unless these advantages are present, operators already in the game are not inclined to spend money—in other words, not to speculate on the possibility that some unforeseen boom or abnormal condition will make the property pay out.

But what, it also might be asked, is to prevent the unitiated—the drygoods merchant and the grocery dealer—from moving in? Some years ago, when the shovel was the only loading tool and screening and picking the only preparation, it was comparatively easy for anybody to go into coal mining. Now, coal production and coal preparation require heavy investments in machinery and a technique and experience not so easily acquired. As time goes on, this will be even more true. So the unknowing and the merely hopeful probably will be less inclined to take a flyer in coal mining except in the form of investment in existing concerns who already have the know-how.

The material also has a bearing on the psychological in free-enterprise operation. Outside competition has forced segments of the industry into price cutting and no doubt will again. But the threat of such competition also has led to unnecessary weakening of the price structure. The answer of the industry is better coal, better burning equipment and better burning methods; in other words, research.

Research is not a magic key. Rather, it is a reliable and effective tool. As the industry increases its efforts in this direction and accompanies them by better merchandising and public-relations work, outside competition should lose some of its terrors, although it will be nothing to dismiss lightly any time in the foreseeable future. But with more research, better coal at lower cost and improved selling, service and public relations, coal will have other weapons than price cutting in battling competition.

But serious as outside competition is, the price cut within the industry is the single most disturbing problem in attempting to operate without outside control. That a great deal of this type of price cutting is unnecessary is freely admitted by coal men. In the preceding paragraphs, some of the arguments why the "material" pressure for price cutting should be less in the future were presented. What, then, are the prospects in the psychological?

The answer turns on many things. The first requisite, however, seems to be efficiency and quality at least as good as the other fellow. Then, assuming no overcapacity, the operator, it is argued, needs only to stand his ground secure in the knowledge that the price cutter cannot take over his entire market or any major part of it. Being no more efficient nor able to offer any better quality, the price cutter's only outlook is going broke, while the operator who refuses to follow him down the road to ruin stands a good chance of holding his own and, in fact, making a profit on what he does sell rather than marking up losses by trying to meet unjustified price reductions.

Three Possible Roads

Perhaps there are other conclusions that might be reached in studying the question of coal stabilization, but the three that follow seem to grow logically out of operator thinking, experience, present conditions and future prospects in coal mining.

1. Federal legislation similar to the past coal acts is supported by the majority of the industry because it is "handy and legal" and does the job. While it means "government in business" and all that it cannotes, including the possibility of more and more regimentation as the years go by, supporters of federal legislation point to the difficulties of stabilization by other means and to the fact that past coal acts materially improved the profit picture in the bituminous industry.

2. Individual initiative and enterprise—in other words, operation without control—still have a good chance in coal mining. Conditions now are more favorable than in years and, it is argued, can be made even better by all-out emphasis on quality and efficiency seasoned with intestinal fortitude in selling.

3. While, as stated, individual initiative and enterprise now are more favored than in years, many opponents of federal regulation with its regimentation and rigidity find operation without some form of stabilization a rather bleak prospect. As a compromise, many operators advocate the sales-agency plan. To safeguard possible agencies from sniping, these operators propose, if necessary, statutory exemption similar to that accorded agricultural cooperatives under the Capper-Volstead and other acts. Stabilization without regimentation might be cited as the watchword of this group.

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Awards Waiting

Coal's 1944 production record, made in the face of growing difficulties, is one the industry can regard with pride. It indicates that numerous mines and collieries — and their supervisory staffs—will be eligible for *Coal Age* "Coal-for-Victory" and "War-Production-Efficiency" awards, given for increasing production 6½ percent or output per man-shift 10 percent in 1944. *Coal Age* wants every possible operation entered and has mailed entry blanks to all companies that available records indicate are operating serialized properties. Additional blanks are available upon request. The deadline for filing is Jan. 31, 1945, as shown by the postmark. If you have an eligible property or properties, file now!

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DIAMOND 2B

Built Around Previous Conveyor Success

High Efficiency With Shaker Conveyors in 30-In. Seam Leads to Selection of Self-Loading Equipment for 52-In. Seam—More Top Storage and Larger Mine Cars and Monitors Feature New 2B Mine

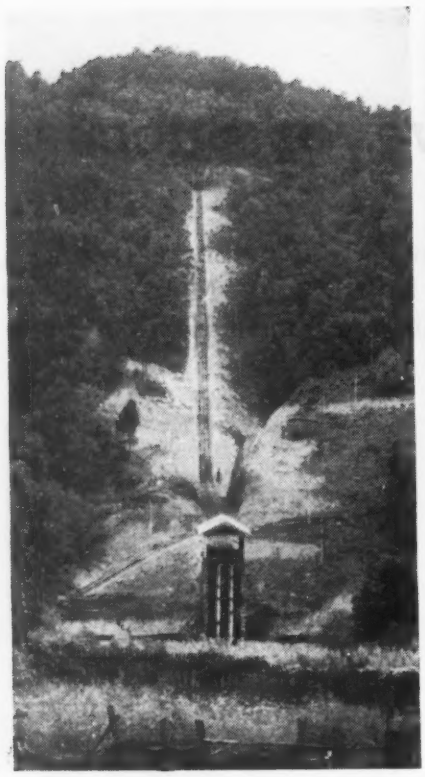
By J. H. EDWARDS
Associate Editor, Coal Age

ALTHOUGH planned to replace No. 2 mine, which will be worked out in two years, a new full-mechanical operation now getting into production will raise the potential capacity of The Diamond Coal Mining Co., Knoxville, Tenn., from a half million to 850,000 tons per year. In this new No. 2B mine, shaker conveyors, the type of equipment successful at Hickey mine will be used for development and production.

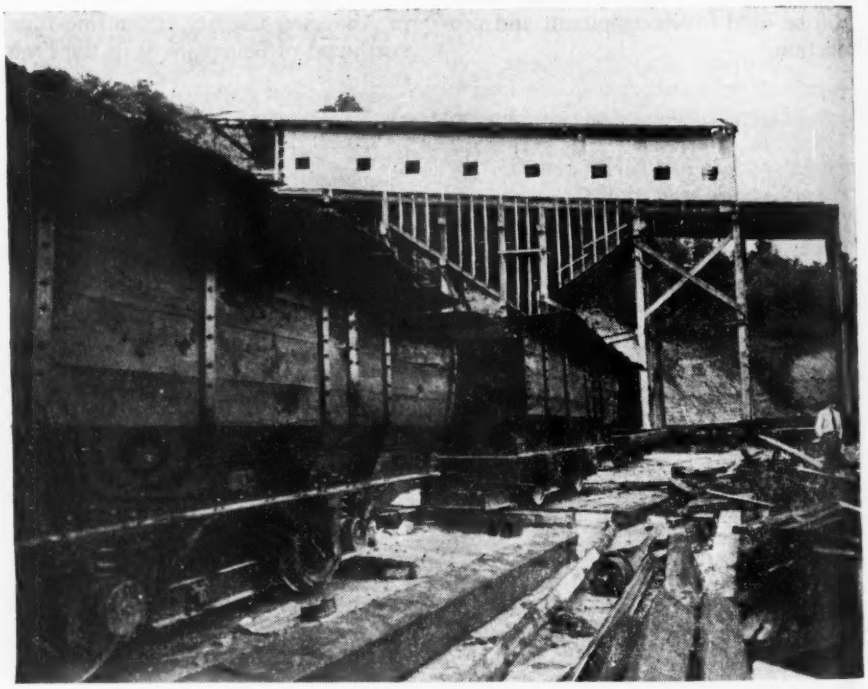
Profiting by experience in opening other properties, H. K. Cook, president and owner, is proud of the 700-ton-capacity bin at the top of the monitor plane, and of the accomplishment of shipping coal seven days less than seven months after starting surveys. He emphasizes the importance of competent and trustworthy key men, and in their recognition his company recently purchased an apartment hotel in Florida as quarters for the men and their families on annual seaside vacations.

No. 2B mine, on the Tennessee Ry. in Anderson County, 28 airline miles northwest of Knoxville, is in the Dean

Finding a suitable location for the monitor plane proved difficult. Final selection involved making a 60-ft. cut and a 50-ft. fill. Above right: Plane uses 75-lb. rails on 7x9-in. creosoted ties. Spur track at left leads to the landing for the man-and-supply cars.



Left: A plane 3,496 ft. long lowers the coal by monitors from the mine elevation of 2,320 ft. to the railroad elevation, 955 ft. Above: Loading bin when first coal was being handled by drop-bottom mine cars on the plane. The bin holds 125 tons. Two more railroad tracks and a screening tipple will be added.



At the left are two 17-ton drop-bottom monitors ready for installation on the plane to replace the mine cars in temporary use.

seam, which here is free of continuous partings, lies practically level, outcrops high on the mountainside (935 ft. above the railroad) and in this territory is predicted to average 52 in. in thickness. On the 6,000-acre lease there are 3,300 acres of seam and the yield is estimated at 20,000,000 tons. Principal markets are railroads, southern steam plants and lake boat fuel.

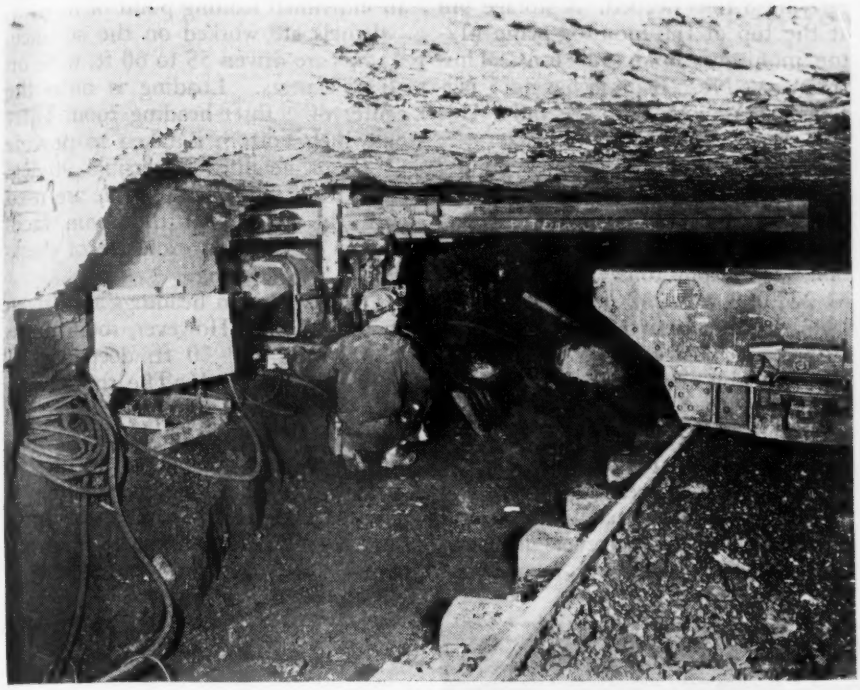
The mine is planned for 40,000 tons per month with three-shift operation underground and one-shift operation of the monitor plane and tipple. Success in this low-cost method of operation calls for large storage at the top of the hill. The hopper for receiving coal from drop-bottom cars is lined with steel plates and built with all sides sloping not less than 27 deg. Consequently there are no pockets to allow accumulations and prevent complete emptying. The car trestle and bin are built of creosoted painted wood.

Years of experience with monitor haulage had demonstrated the necessity for a straight, well-graded track of permanent construction. While 60-lb. rails have been used customarily on planes, 75-lb. are used here and are set on 7x9-in. pressure creosoted ties which should last 22 to 25 years.

Plane length is 3,496 ft. The maximum grade is 34 percent and the minimum is 10. It was difficult to find a suitable location for the plane within the limitations of a desirable location for the tipple. The best location required making a 60-ft. cut through a hump near the foot and a fill across a ravine 50 ft. deep.

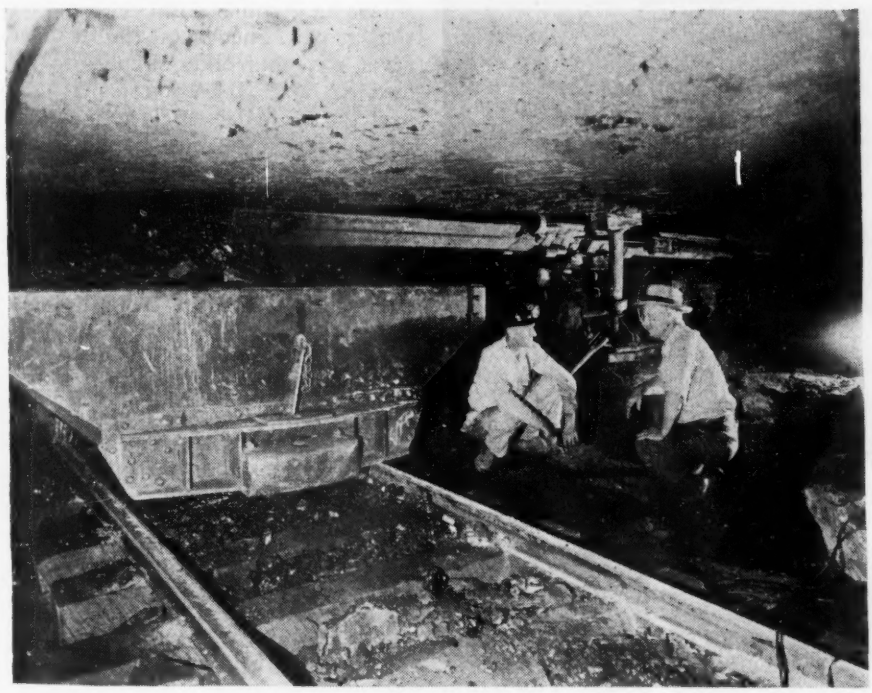
The two monitors, automatic drop-bottom units carrying 17 tons, were purchased from the Sanford-Day Iron Works, are equipped with Timken bearings and have wooden sides. Slope rollers were made by the same company and have Timken bearings also. The ropes are Leschen Red Strand 1¼-in. Type B (flattened strand) with hemp center. Gage of the monitor tracks is 44 in., the same as the mine gage. This allows not only using a monitor track for hoisting men and supply cars but as soon as the plane track was completed it permitted coal from development work to be let down the hill in mine cars.

The plane is of the three-rail type with a four-rail section at the center



Loading point in development work in the new mine. Car Trimmer Wiley Anderson has his hand on the portable pushbutton which controls the shaker drive.

The site of this 1918 operation—Mr. Cook's first experience and investment in coal mining ($2,000) and where he loaded coal himself—is but 3,000 ft. from the tipple of his newest operation.



Level full, the drop-bottom cars hold 6 tons. With a 5½-ft. room heading height they are loaded to 8 tons. Charles Walls (left) is superintendent of Mines 2 and 2B and M. L. Shipwash (right) is vice president in charge of operations

for passing. The man-and-supply hoist is an Ottumwa unit of generous size, driven by a General Electric 440-volt 112-hp. motor. The rope also is Leschen-made but is ⅞-in., 6x19 hemp-center construction, plow-grade steel.

Present equipment at the bottom of the hill consists of a monitor dump-house and 125-ton bin, from which straight run-of-mine is loaded. Although to date there is but one railroad track, grading has been done for three more.

Good transportation is a feature Mr. Cook has found highly important. Haulage equipment for this newest property of a Jeffrey 10-ton locomotive and 40 new Sanford-Day steel automatic drop-bottom cars, 7x16 ft. inside and 33 in. high, with a level-full capacity of six tons. Actually they are filled to about 8 tons and can store about 300 tons in addition to the 700 tons in the top bin. These Sanford-Day "1-2-3" cars have spring draws and bumpers at one end and are without brakes.

The haulage portal is but 350 ft. from the headhouse dump hopper. Sixty-pound steel is used exclusively for mine tracks.

Six new Goodman G20 shaker conveyors with the latest automatic duckbills and Ohio Brass automatic motor starters are now at the mine. Both entry and room work will be handled by the ducks, including rock loading for additional height on the haulways.

Temporarily, until delivery of new machines in January, cutting is being done with three Jeffrey 35B and three Goodman 112 universal machines. The five new machines will be Goodman 512 units with 7-ft. bars. Drilling is done with Little Giant No. 472 electric hand-held drills and shooting with Herco permissible. Blowers and tubing are used for providing adequate ventilation, plus extra air for quickly clearing fumes caused by shooting. Blowers are Brown-Fayro Model B.C. and tubing is 12-in. Mine-Vent made by the American Brattice Cloth Co.

Power is purchased and direct current is generated by a General Electric synchronous set—motor, 290-hp. 2,300-volt, and generator, 200-kw. 275 volts. Lamp equipment is 60 Model P Edisons.

No. 2B mine is in a seam suffi-

ciently thick to allow use of duckbills, which in turn require that room width be limited to 30 ft. Except for that, mining methods will follow closely those eminently successful in the company's Hickey mine, in adjoining Campbell County. Beginning in a small way six years ago, that mine, in the Red Ash seam, there ranging from 24 to 36 in., was completely mechanized with shakers (coal hand-loaded onto shakers; rock duckbill-loaded). Production is 900 to 1,200 tons daily. Underground work is on three shifts and the monitor plane and tipple operate one shift. For room crews, production averages about 16 tons per man-shift including the car trimmers.

When mechanical work was inaugurated at Hickey mine, 4-ton drop-bottom cars were installed but soon were replaced by cars of the same type carrying 8 tons heaped. A storage bin at the top of the monitor plane (12-ton monitors) holds 400 tons. Thus the newer No. 2B mine has a 75 percent increase in top storage and a 41½-percent increase in monitor size.

Tonnages produced at Hickey mine have increased steadily in the face of stringent labor shortages in that section of Tennessee. In 1941 production was 217,000 tons. It was boosted to 227,000 in 1942 and 286,000 in 1943. This year it has been running 10 percent ahead of last year.

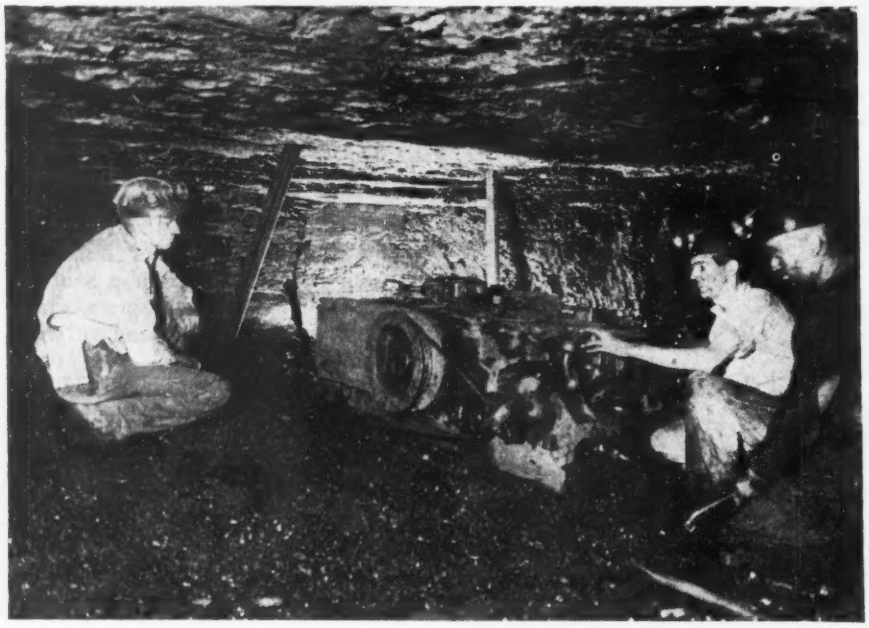
Production and development equipment at Hickey consists of nine Goodman G12 shaker conveyors and two duckbills. Four of the shakers are in entry work and five in rooms. No mother conveyors, separate cross conveyors or elevating conveyors are used. Each conveyor discharges to a car at an individual loading point of its own.

Panels are worked on the advance. Rooms are driven 55 to 60 ft. wide on 70-ft. centers. Loading is onto the center of a three-heading room entry on which bottom is taken to provide 5½ ft. of height. Reversible 90-deg. angle turns made at the mine are used with the shakers at the room faces and in entry work, exclusive of duckbills in rock loading.

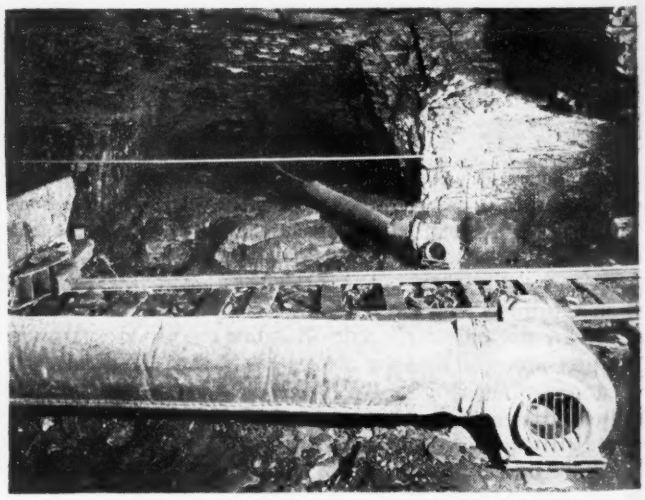
Only two room headings are driven on the advance. However, room necks 12 ft. wide and 30 ft. deep are included in this work. The third heading is driven as a series of connecting crosscuts by the room conveyor unit on one side of the panel. With the shaker drive in its room position, a crosscut is driven by use of an angle turn; then, after the room is advanced narrow for 20 ft., it is increased to full width.

The leader of the six-man crew is the cutting-machine operator and when not otherwise engaged he loads coal onto the face conveyor. Getting supplies to the face is a responsibility of the car trimmer. A small truck which the trimmer pushes along in the shaker pan line takes timber, conveyor pans and other supplies to the face. A 16-ft. telescopic pan is used next to the 90-deg. angle turn so that an additional pan must be put in the main line only after each two cuts.

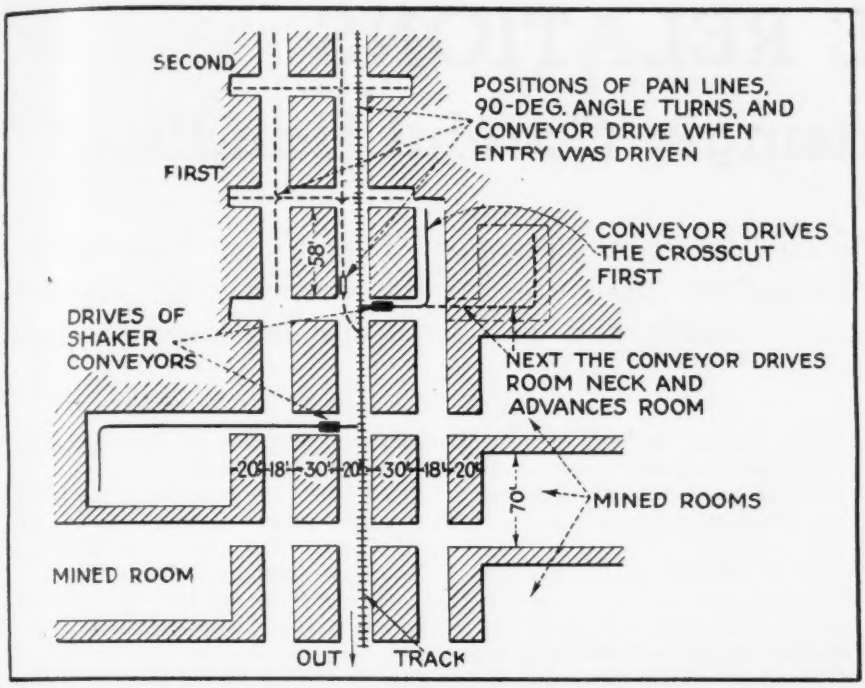
To reduce delay when a room is completed to about an hour, an extra conveyor drive is set up in advance in the next crosscut or room neck. As soon as the last cut in a room is completed, the machine man starts moving his machine to the next room. As the other face men leave they disconnect the pans, carry them on the small truck over the pan line and store them at the room neck. A special crew of two men closely super-



Seam thickness is 48 in. in this heading in the new mine.



Left: The 12-ft. headings are shot with three holes. Harve Russell is the shotfirer. Blowers and tubing quickly remove fumes from working places after shooting.



Within the limitations of slightly different equipment for working in a greater thickness, layout and methods in Mine 2B will be patterned after this plan used at Hickey.

Key men and their families can vacation at Seway Hotel Apartment at Surfside, just north of Miami Beach, Fla., purchased by The Diamond Coal Mining Co.

vised by the mine foreman moves and sets up the drives in three hours or less. They use a small chain block to get them on and off a low flat car.

Haulage headings of room entries are driven 10 to 20 ft. wide, depending on roof conditions, and the aircourse 18 ft. wide. The entry, with room necks, is advanced 280 ft. with one set-up by using two reversible 90-deg. angle turns. Bottom, 10 ft. wide to give a total height of 5½ ft., is taken next to the rib and the rock is gobbed on the other side and in 12x12-ft. holes cut in the ribs of the entry pillars. Gobbing is done by hand. Where insufficient space is available some rock is hand-loaded into mine cars and hauled outside.

Main and cross-entries, each consisting of two headings on 45-ft. centers, are driven 267 ft. with each set-up. The haulage heading is 12 ft. wide and the aircourse 18 ft. After the coal has been taken for 267 ft. the pan line is taken up and the top shot and loaded by duckbill to get an over-all height of 6½ ft. A three-man crew, including the car trimmer, is used in each case. In coal they get three or four cuts per shift, equal to 25 to 35 tons, and in rock they advance two or three 8-ft. shots.

The drawing indicates how the room conveyor working on the right side of the panel first uses a 90-deg. angle turn to advance the crosscut which forms a section of a third entry, then drives the room neck 20 ft. deep with a straight pan and again uses the angle turn to drive the widened room. The short, heavy broken lines indicate positions of a shaker conveyor and the reversible 90-deg.-angle turns when the room-entry was driven. In the first and third crosscuts driven in a new set-up, two reversible turns are used in the work to the left and in driving the aircourse both ways 58 ft. In the second crosscut time is saved by not having to install the second angle turn.

In driving a double-heading entry the main section of the shaker conveyor line is on the haulage heading; parallel to the track. The curved pan method of discharge is used.

Chain pillars are alternately 198 and 45 ft. long and the crosscuts between are 12 ft. wide. In making the 267 ft. of entry advance with one set-up, the total of single-heading and crosscut distance driven is 564 ft. At the beginning 700 ft. was the centers distance between room-entries in Hickey mine, but was changed to 600 ft. Based on that experience, panels in 2B mine also will be on the shorter centers.

Competent key men with a real interest in the company's welfare constitute one of the principal requirements for success, according to Mr. Cook. The Diamond Coal Co. has about 30 key men and it was in appreciation of their services that the company bought the hotel apartment in Florida. Beginning next season each key man will have an opportunity to use one of the apartments without charge during his two weeks' summer vacation. Known as Seway Apartments, the building has 27 two-and three-bedroom suites, each with living room and kitchenette. Bedrooms have separate tiled baths. The property is in Surfside, just north of Miami Beach, and has 200 ft. of ocean frontage.

H. E. Jackson is treasurer of The Diamond Coal Mining Co., M. L. Shipwash is vice president in charge of operations, and Miss J. E. Keener is secretary. The directorate consists of Mr. Cook, the officials just mentioned and Fred Legg, of Cincinnati, president of the Logan Kanawha Coal Co. Logan Kanawha is sales agent for Diamond's commercial coals, of which the top grade is "Red Chief," from Hickey mine. Ed Claiborne is superintendent of Hickey mine and Charles Walls is superintendent of Mines No. 2 and No. 2B.

EMPLOYEE RELATIONS

Call for Increasingly Careful Handling*

Growth of Social Legislation, Spread of Unionization, Surplus Jobs and Rise in Wage Rates Present Serious Obligations to Employers—Favorable Local Publicity and Vocational Training Important Aids

By J. J. FOSTER
Assistant to the Vice President
Island Creek Coal Co.
Holden, W. Va.

NEVER BEFORE in the history of the coal industry has the human side of our business been so important as today. That is a conclusion with which, I think, most of us agree. Since, even in wholly mechanized mining, labor cost is such a large percentage

J. J. Foster

of our total cost, we must all be deeply concerned not only about the present attitude of our employees but particularly about their attitude in the future, when the industry returns to a "survival of the fittest" basis.

There are many things which could and, I think, should be done about our employee relations in the coal business. Failure to recognize these obligations and do something about them may lead to serious consequences, the least serious of which will be the loss not only of many of our better employees but a large portion of our potential employees, as they graduate from our schools to other industries.

I shall attempt to outline a few of the more important of these things, knowing that some of them should be handled by the industry as a whole while others should be managed by individual companies and that, because of varying conditions and size of organizations, it would be necessary at best to vary such a program to meet the individual needs of each operator.

1. We would all do well to analyze carefully our individual situations.

Most of us have suffered a continuous headache as a result of the manpower problem during the last few years and are interested in some remedy. In the mad scrabble for production, however, we have had little time for diagnosis and have simply assumed that since practically all industry was having the same trouble it was the result of a surplus of high-rated jobs that would pass with the war.

The fact should be kept in mind, however, that the industrial employee, as well as his employer, took a lot of punishment during the early thirties after having been on a rather wild spree during the late twenties. He was, as a result, in condition for a complete remodeling and, as all of us well know, a workmanlike job was done. A mass of social legislation, a tremendous expansion of unionization, an upturn in employment and wage rates, a national emergency, a surplus of jobs, and top earning capacity for all time have combined to leave us with a completely changed and ex-

For Better Relations With Employees

Ten suggestions for better relations between employer and employee are offered by Mr. Foster, as follows:

1. Analyze the situation carefully.
2. See that personnel get a better understanding and higher opinion of the industry.
3. Sell the younger generation on the advantages of mining as a career.
4. Seek a higher type of supervision.
5. Give more attention to employment procedure.
6. Give careful attention to reemployment and placement of returning veterans.
7. Train foremen thoroughly so that they will be capable of showing new employees the right way to "do the job."
8. Inculcate in foremen the ability to handle people.
9. Clear up grievances, real or imaginary, promptly.
10. Provide good housing and recreational facilities.

* *Abstract of paper entitled "What the Coal Industry Can and Should Do in the Way of Personnel Relations," presented at 37th annual meeting of West Virginia Coal Mining Institute, Charleston, W. Va.*

MEN WHO COUNT—The miner, says Mr. Foster, is a different individual now and expects to be so treated. His good will warrants real effort in relations with employees. The rewards are improved teamwork, job satisfaction and greater efficiency.

tremely temperamental individual. There are many exceptions, of course, but I am speaking of the average worker. He now requires, and will, I think, continue to require, smarter handling as well as more consideration and concessions than generally have been accorded in the past.

2. Our personnel should have a better understanding and a better opinion of the industry with which they are connected.

Too many of our employees have read little but unfavorable comment about the industry. Being human, there is ever present that common tendency to think the "fields are greener" in all other industries.

In addition to the national educational campaign now being conducted by the industry we should see that we get more favorable local publicity. If all our employees were convinced that, after all, they are not a part of the dirtiest and most hazardous industry in the country, they could be of great value in carrying the story outside the industry and attracting better workmen from other occupations. There are literally hundreds of less desirable places to work and live than in or about a bituminous coal mine, but we still need to sell that fact to a large number of our employees and their families.

3. We need to sell more of the boys who grow up in our communities on the advantages of pursuing mining engineering courses and returning to us for employment.

Too many fine boys born in mining communities think only of graduation into some other industry.

The type of vocational school recently inaugurated in Beckley, Pineville, Bluefield, Logan and possibly at other points in coal-producing centers should be very helpful, since they have employed practical men to teach the skills which can be employed in and around the mines. Cooperation of the industry is badly needed. We should see that they get old equipment for practice work. High-school boys like to tinker, and many of them will become interested in the mining skills. Many of our future foremen will be graduates of these schools if we make the most of our opportunities there.

4. We should strive for a higher type of supervision.

The changed worker must be supervised by a smarter, keener and more alert foreman. Mechanization requires more skill and a higher type of workman, who in turn requires a supervisor with ability to plan and coordinate. We must use more care in selection of potential foremen and then give them the necessary training. We must develop their leadership ability, which is going to be as important as their technical ability in the future. I commend to you the booklet, "The Supervisor," recently distributed by the Southern Coal Producers' Association. It is full of good suggestions with regard to selection, training and top management relations with supervisors. The supervisor truly is the key to your employee relations problem. An outstanding labor leader said a few months ago: "A stupid foreman is the best possible labor agitator; I have never been able to organize a thoroughly well-managed plant."

5. We should give more attention to our employment procedure.

Right now we must employ anyone who applies. Experience, training and physical condition requirements have been relegated to the background. The end of the war, however, will place us in position again to select from a more bountiful labor supply. Since many of the lasting impressions of the company are formed during the employment procedure, it is important that some orderly plan be followed.

Someone of the proper temperament should be assigned to the duty of interviewing prospective employees. He should, if possible, be familiar with the skills and physical requirements of the jobs. He should receive from the foremen daily requisitions for men needed. After the complete record of the applicant's previous employment, experience, training, etc., has been obtained he

should go to the foreman for whom he is to work, and the foreman should be allowed to approve or reject him.

6. The reemployment and placement of returning veterans promises to be one of our toughest postwar problems.

As a matter of fact, some veterans are coming back now, and most of us have had enough contacts already to know that we will have to handle these boys with a lot of tact. They are, of course, entitled to every possible consideration. They must be provided with jobs promptly, and a lot of planning and training of foremen and other key employees will be necessary if they are to be fitted smoothly back into civilian life. Poor judgment and improper care in placing and handling, particularly of physically handicapped veterans, will surely lead to serious consequences. We should establish a definite policy, know our moral as well as legal obligations and, above all, exercise infinite patience and sympathy without making a show of either.

7. Most training for work in and around the mines will continue to be done on the job.

Progress is being made in teaching prospective miners in vocational schools, and many young men will with profit pursue this preliminary training, but a large percentage of the new men will go on the various jobs without training. In order that the new men may be taught to do the job the right way, it is important not only that the foreman know the job but that he be capable of instructing the new man so that he will learn to do the job correctly and in the shortest possible time. We have used the "Training Within Industry" course in "Job Instructor Training" to excellent advantage in this type of foremanship training.

8. Of ever increasing importance is ability of foremen to handle people.

To the worker, the foreman is the company, and his opinion of not only his job but the company as a whole grows largely out of the way he is handled on the job. With this idea in mind we have given our foremen some training for this particular angle of their work. We have supplemented our own plan by use of another T.W.I. course in "Job Relations." We also have used, with very satisfactory results, sound-slide films.

9. Grievances, real or imaginary, are of utmost importance in the proper handling of personnel.

Most of us are inclined to think of grievances as something having to do only with administration of our union agreement. On the contrary, most gripes are about something entirely apart from the contract and, if allowed to exist without attention, frequently breed serious consequences. Many of them are of little importance, but if the worker thinks something is wrong, someone should attempt to clear it up quickly if we expect efficient work.

10. There is a growing need for better housing as the standard of living rises.

By actual experience, we know that more and better recreational activities pay dividends in the form of less juvenile delinquency and by attracting a better type of worker with his family.

Boy and Girl Scout troops, adequate church buildings, parent-teacher associations, vacation Bible schools, arts and crafts classes and good schools are some of the community activities deserving our attention and financial support. They all help to make our communities better places in which to live and rear families. We believe these activities are as important as good working conditions in attracting the better type of workers and in keeping them satisfied.

Granting that all these are good suggestions, it will be said that they are a big order, requiring an expenditure that will be burdensome in normal times. I agree that they will cost something, but I am sure we will be able to more than offset the expenditure by attracting and holding the hundreds of our best men who are each year leaving coal for other industries where these things are receiving attention. After all, we have, as a matter of necessity, been doing for years after some fashion most of the things I have suggested. Our greatest need now is to realize that they are an asset and then organize and expand these personnel relations activities so that they will yield the maximum benefits.

Exhaustive surveys of industrial workers indicate that not wages and hours but *recognition* is at the top of this list of wants. The worker wants to be somebody, to be recognized as a member of the team. He wants his family to have some standing in the community. He wants to have the "big boss" recognize him. He wants to know his job is secure if he does good work. He wants a decent place to live and rear his family. All these an overwhelming majority consider more important than wages and hours.

This is not a program that can be delegated to some clerk and forgotten. It is a job for the entire supervisory and clerical organization. One grouchy payroll clerk can do more to disrupt satisfactory employee relations than all the other people in your organization can offset.

On the other hand, there is no possible chance of anyone to whom the work is assigned making a success of the program without the complete cooperation of the management, from the president to the least important supervisors. You cannot separate responsibility for getting results from the responsibility for the people who have to get these results.

It is a cooperative movement, intended to create and promote teamwork and job satisfaction: mutual cooperation for common good. If the program is a success, the cost will be returned to you in the form of increased efficiency as well as in satisfaction for having done something worth while for your employees. It will be a success if you keep ever in mind the fact that any such program, to be worthy of your support, must be founded and administered on the principle originating in Matthew VII, 12, in these words: "Therefore all things whatsoever ye would that men do to you, do ye even so to them."

ENTRIES WANTED

If you have a serialized mine or colliery that increased its production 6½ percent or its output per man-shift 10 percent in 1944, it should be entered for a *Coal Age* "Coal-for-Victory" award or awards. Entry blanks were mailed to all companies operating serialized mines early in January. Fill yours out and send it in. If, by chance, you did not receive a blank or blanks, write and they will be forwarded immediately. The deadline for filing is Jan. 31, 1945, as shown by the postmarks.

POWER USE
In Hand Loading and Mechanical Mining*

Mechanical Mining Does Not Materially Alter Power Use in Face Zone but Requires More Substation Capacity for Good Service—Over-All Use Increased by Losses and Greater Usage Elsewhere

By J. C. CREE
West Virginia Engineering Co.
Charleston, W. Va.

A COMPARISON of power used for hand and mechanical loading should be easily obtained. But when all factors are taken into account the total power used for the entire mining operation becomes involved. Because of the unknown factors, this discussion will be limited to a few experience records. Analyzing face operations in mechanical mining results in the following:

1. Mining-Machine and Drill Operation—In the same seam of coal, power consumed by mining machines and drills should be the same for any mining method.

2. Conveyors—Power for conveyor operation from the face to the room neck has been found, by test, to be about 10 percent higher than for gathering locomotives. The figures were about 0.25 kw.-hr. per ton for gathering locomotives at one mine and 0.28 for conveyors at another mine. These values may change at other operations where conditions are different.

3. Mobile Loaders—Mobile-loader operation results in a definite increase in power use and this increase at one mine has been found to average about 0.15 kw.-hr. per ton. Results at other mines may be higher or lower. Coal transportation behind mobile loaders, where track haulage or shuttle cars with cable reels are used, should be considered the same as in hand loading. Where battery-powered shuttle cars are employed, power consumption undoubtedly is increased because of the losses in the batteries.

This analysis indicates for conveyor mining an expected increase of only about 0.03 kw.-hr. per ton, against about 0.15 kw.-hr. per ton for mobile loaders with track haulage. It must be remembered that the comparison so far has been limited to face operation.

Experience has indicated that in mechanical loading circuit losses usually are greater as a result of concentrated activities compared to hand loading. Substation capacities also are greater.

In hand mining, according to the records, the ratio of d.c. horsepower to substation capacity ranged from 3 to 3½ per kilowatt, while for completely mechanized operations this ratio seldom exceeds 2.5 and often is 2 d.c. hp. per kilowatt of substation capacity. Operation of this additional substation capacity for mechanical mines therefore must be considered.

Mechanical mining has, for the majority of the operations, resulted in increased power use for coal preparation. Usually, a cleaning plant has been added. This is another of the additional factors that have affected power use and that indicate that the total power must be considered rather than just power for face operation. The power records of several mines, with comments thereon, follow:

Mine A—In 1929, this mine, on a completely hand-loading basis, produced an average of 16,400 tons per month with 200 kw. of substation capacity, a monthly average demand of 216.5 kw. and a power use of 3.61 kw.-hr. per ton.

In 1942, this same mine, after four years of 100-percent conveyor operation, averaged 18,100 tons per month with 400 kw. of substation capacity, a monthly demand of 395 kw. and a power use of 6.80 kw.-hr. per ton.

Haulage distances increased about 20 percent and tipple power use increased about 25 percent although no complete cleaning plant was added. The increased tipple consumption resulted from two-shift operation and use of additional conveyors to facilitate hand cleaning the coal. Substation capacities, demands and power use roughly doubled.

Mine B—In 1929, this mine averaged 32,450 tons per month with 600 kw. of substation capacity, an average monthly demand of 528 kw. and a power use of 5.60 kw.-hr. per ton. In 1942, this mine produced 34,200 tons per month— about 65 percent loaded by mobile units and the remainder by conveyors. Substation capacity was 900 kw., average monthly demand was 1,097 kw. and the power use was 9.81 kw.-hr. per ton. A large cleaning plant was in operation and no attempt is made to clean coal at the face at the present time.

Mine C—In 1929, this mine produced 35,800 tons per month with 400 kw. of substation capacity, a demand of 412 kw. and a power use of 3.53 kw.-hr. per ton. With a change in management, two-shift operation and doubling of the average haulage distance, average production in 1943 was 79,300 tons per month. A total of 1,100 kw. of substation capacity was necessary and 500 kw. of this capacity was used for haulage only. The average monthly demand was 935 kw. and the power use was only 3.67 kw.-hr. per ton.

Other records might be given but these three have had about the same conditions for the period of time considered, with the exceptions that have been noted. The interesting facts are:

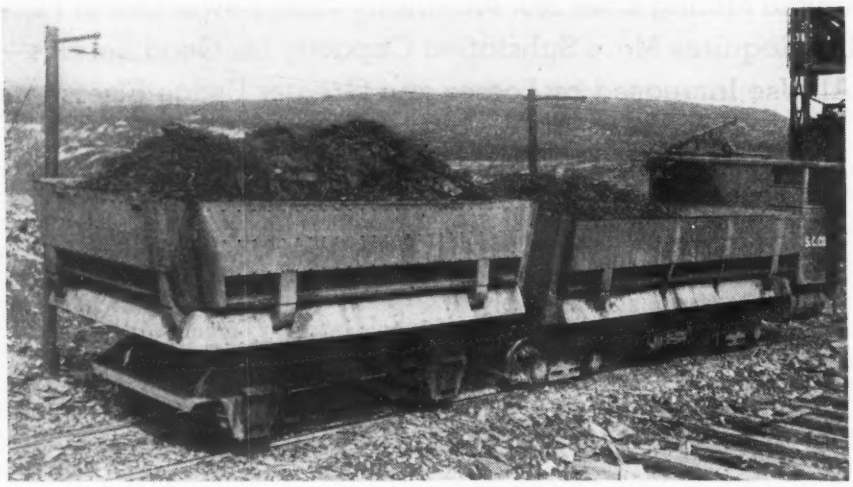
1. The rise in substation capacity.
2. Substation capacity indicates the average monthly demands of the mine for any year.
3. Increased power use is shown at Mines A and B, with no corresponding increase at Mine C, which may be due to the greater tonnage at this latter operation.

The conclusions then would be that power use for mechanical mining does not materially increase in the face zone but that greater substation capacities are required for adequate service. Total power use for equal tonnage probably will increase because of the intangible factors, such as greater conversion and transmission losses and also increased consumption for coal preparation, where mechanical mining is the practice.

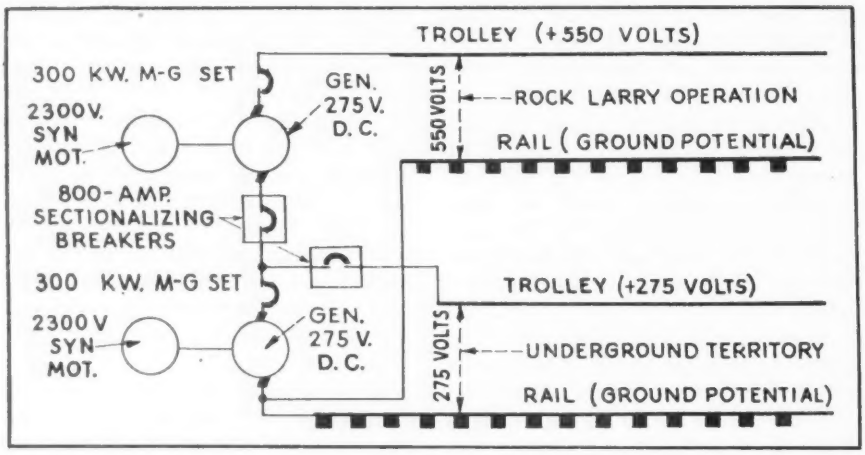
* Abstract of a paper entitled "A Comparison of Power Use for Hand Loading and Mechanical Loading," presented at the November, 1944, meeting of the West Virginia Coal Mining Institute.

DYNAMIC BRAKING

Cuts Larry-Car Brake-Shoe Replacements



Larry car, partially loaded, and trailer unit are shown leaving the loading chute.



System layout shows generator connections for obtaining the 550-volt service, using two 275-volt generators.

Adolph Sutter (right), colliery electrician, and the operator of the larry car discuss the care of the equipment.

DYNAMIC BRAKING has practically eliminated the need for replacing brake shoes on an electric larry and trailer unit handling refuse at the Glen Lyon colliery, Susquehanna Collieries Co., Glen Lyon, Pa. While the dynamic-braking feature had been in service only six weeks at the time this article was prepared, records showed that brake-shoe replacements had dropped from 24 to 30 per month to only two per month. They may go even lower, in the opinion of mine officials. Before adding the dynamic braking some trouble was experienced with loose wheels, the frictional heat having caused the solid wheels to expand and turn on their axles. This trouble is now expected to disappear.

Faced with the need of securing more efficient refuse-disposal equipment at a time when deliveries were very tight, the officials of the colliery found it advantageous, instead of the 275-volt equipment desired, to accept a 550-volt job without the dynamic-braking feature. This unit, built by the Differential Steel Car Co. and equipped with General Electric traction motors and control, went in service in September, 1943. A motor car with an 18-cu.yd. two-way-dump body and a trailer car with a 15-cu.yd. three-way-dump body comprise the working unit.

The refuse from the Glen Lyon breaker amounts to about 14 percent of the raw product. With tunnel and mine rock added, the average handled is approximately 750 tons per shift. In disposing of the refuse it is first hoisted in 10-ton gunboats up a long incline to the top of a nearby mountain. An electric hoist at the top handles two such gunboats in balanced operation. At the top these gunboats discharge into a small storage bin from which the larry unit is loaded. The larry unit can accommodate three gunboats per trip.

The 56½-in.-gage 60-lb. track stretches along the top of the mountain for 2,500 ft. to the spot where the refuse is now being dumped. For the first 1,500 ft. of this stretch of track the grade is 7 percent, and for the final 1,000 ft. the grade is 5 percent, all grades being against the loads. Despite these grades the operator makes a round trip in 7 to 8 minutes. Acceleration of the larry

unit is smooth. The master controller has 14 running points alone for motoring, and is laid out for progressive series-parallel operation.

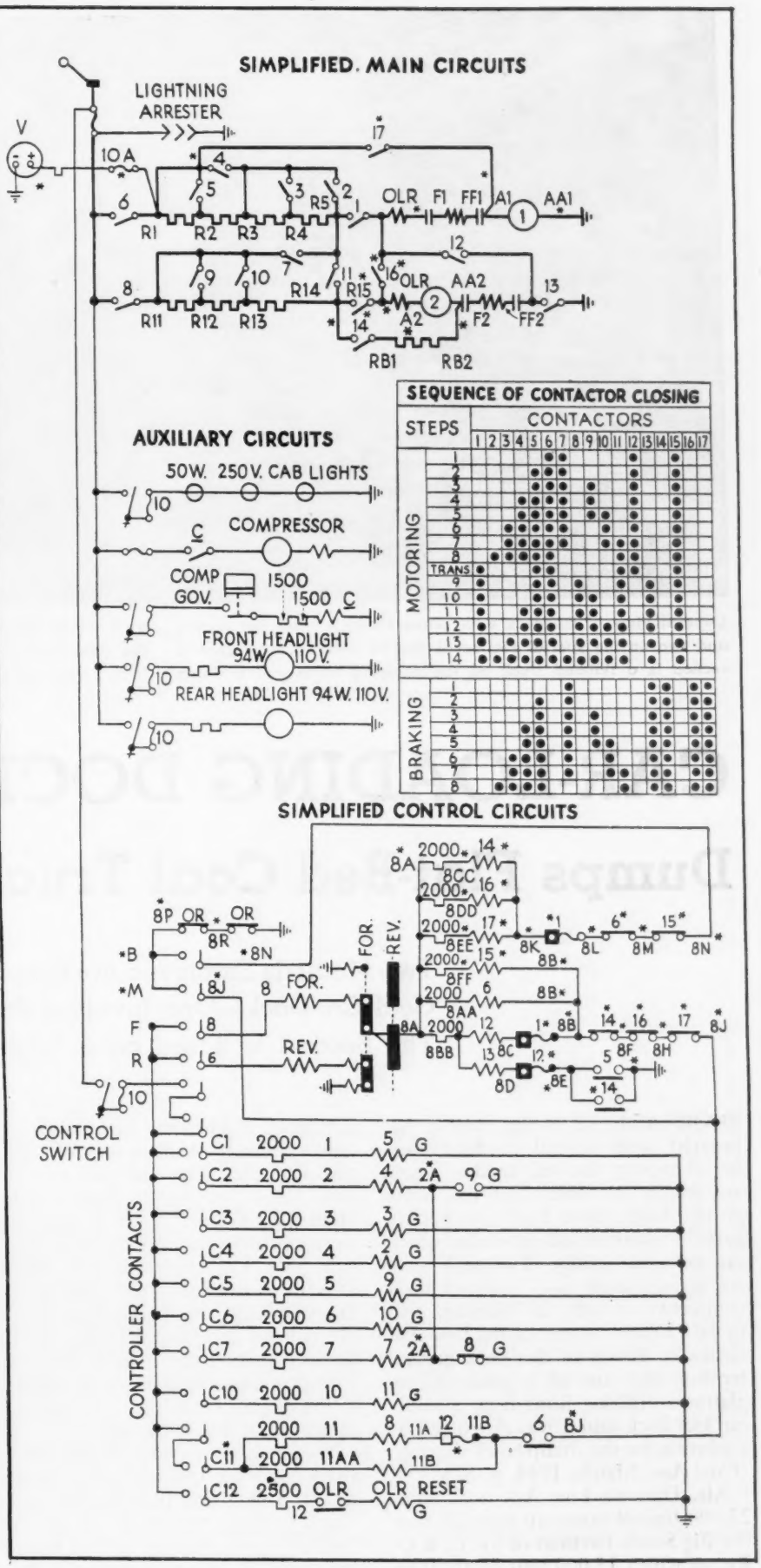
After both dump bodies have been emptied by compressed air, the operator starts the unit downgrade by motoring. Once the unit has gotten a good start, the limiting of its speed is given over to the dynamic braking. The master controller has eight points of dynamic braking, but most of the trip back is made on the fourth point. Just before reaching the loading chute, the operator uses the fifth and sometimes the sixth point.

To provide 550-volt power operating this unit it was necessary to install a supplementary 300-kw. m.g. set and wire its 275-volt generator in series with a 275-volt generator of the 300-kw. set already supplying service to the underground mining operations. Two Type MSC 800-amp. I.T.E. sectionalizing breakers are used for network protection.

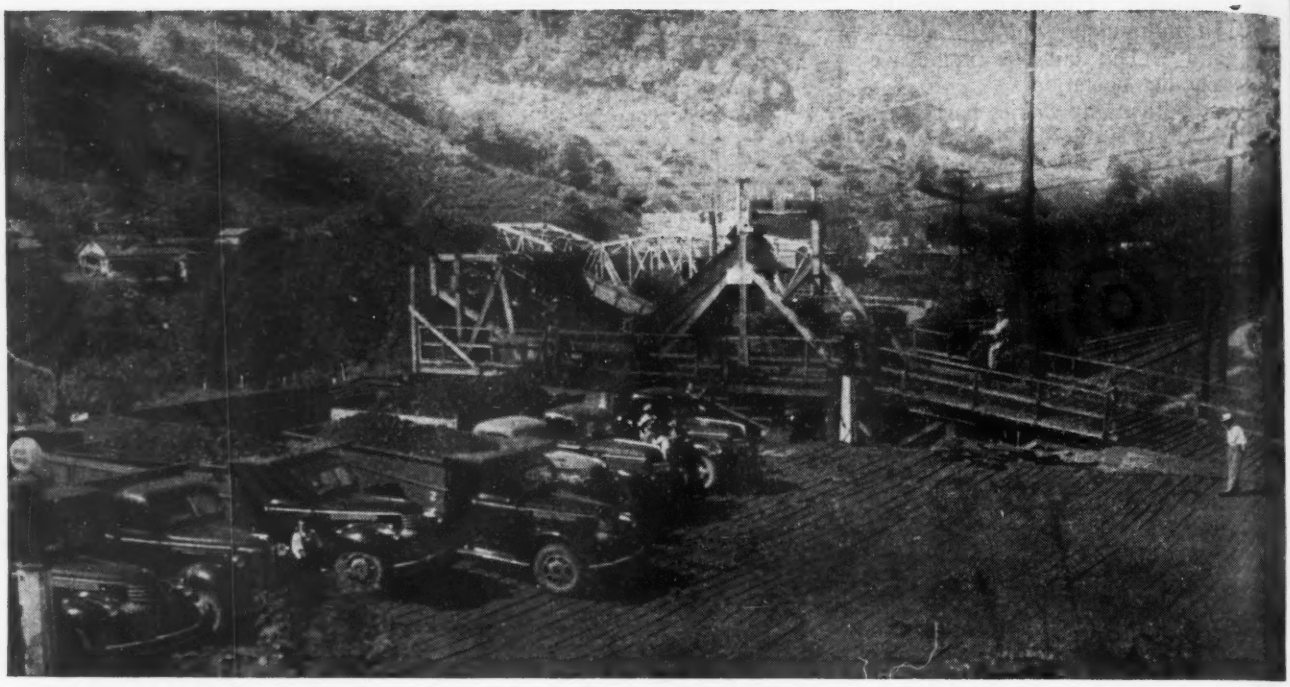
Power for the larry unit is supplied through a 4/0 grooved trolley wire and both return rails are bonded with 4/0 copper-welded bonds. All cross-bonds are 4/0 and spaced 300 ft. apart.

The installation of the dynamic-braking equipment was done by the electrical force of the Glen Lyon colliery under the supervision of Adolph Sutter, colliery electrician. C. H. Matthews is mechanical and electrical engineer for the Susquehanna Collieries Co., Nanticoke, Pa.

Russell Worrall, assistant mining engineer, inspects a rope roller on the gunboat incline.



Wiring diagram for the larry car shows the sequence of operation for both motoring and braking. The symbol (*) indicates the equipment added or wiring changes that were made to provide for the dynamic braking feature.



General view of the dock with seven trucks on the flat section and two on the special section at the far end. On the special section is a flat-bed truck on the dumping ramp and a dump truck (body raised) on the tilting platform (in down position). At the right, sitting on the draft horse used in shifting cars, is Jack Dalton, owner of the Low Ash Coal Co.

CAR-LOADING DOCK

Dumps Flat-Bed Coal Trucks to Two Track

Two Methods Employed in Dumping Flat-Bed Trucks at Low Ash Coal Co. Dock—One Involves Steep Ramp for Front Wheels—The Second Is Based on a Tilting Platform With Power Hoist

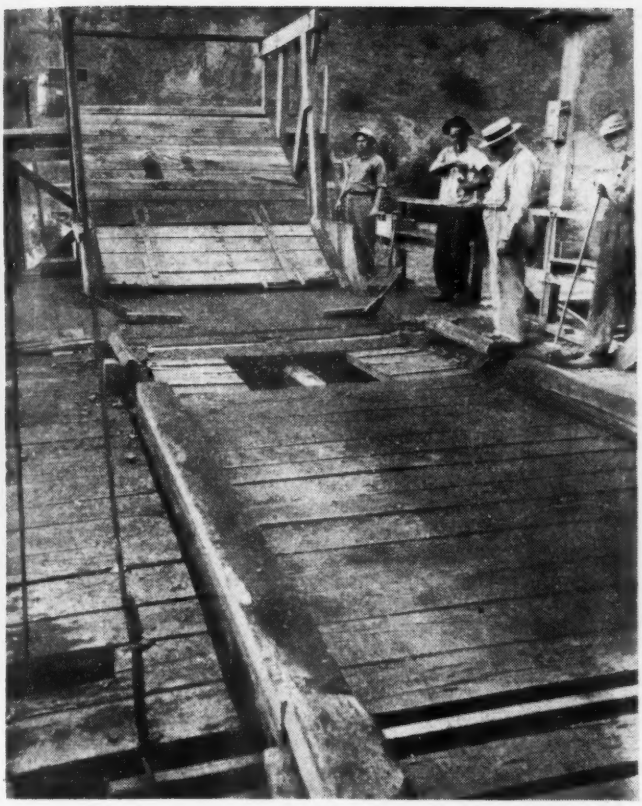
SHORTAGE of dump trucks has brought forth several practical ideas for dumping flat-bed trucks, which are readily available, cost less, carry greater loads, have fewer mechanical parts to maintain and use bodies which can be made locally. Two such ideas are incorporated in a railroad dock completed recently in Pikeville, Ky., by Jack Dalton, owner of the Low Ash Coal Co. It was in this same general territory that use of a gravity-tilting platform utilizing irons from a mine-car kick-back dump was developed as a solution for the dump-truck shortage (*Coal Age*, March, 1944, p. 82).

Mr. Dalton's Low Ash dock ships 25,000 tons of mine-run monthly over the Big Sandy Division of the C. & O. Ry., of which 15,000 tons comes from his own six mine openings in the No. 3 Elkhorn seam on Ferguson Creek, 2½ miles by truck. Most of this haul is over U. S. Highway 119, which extends through Williamson, W. Va., and Pikeville. The coal goes to steel mills and byproduct plants. The other 10,000 tons comes from other truck operators in the vicinity of Pikeville. Mr. Dalton reports that 5,000 tons of truck-mine coal now leaves Pikeville daily over the C. & O. With the railroad company delivering empties twice a day to his dock he can load 35 cars a day. He commends officials of the C. & O. for the excellent car service given the truck mines.

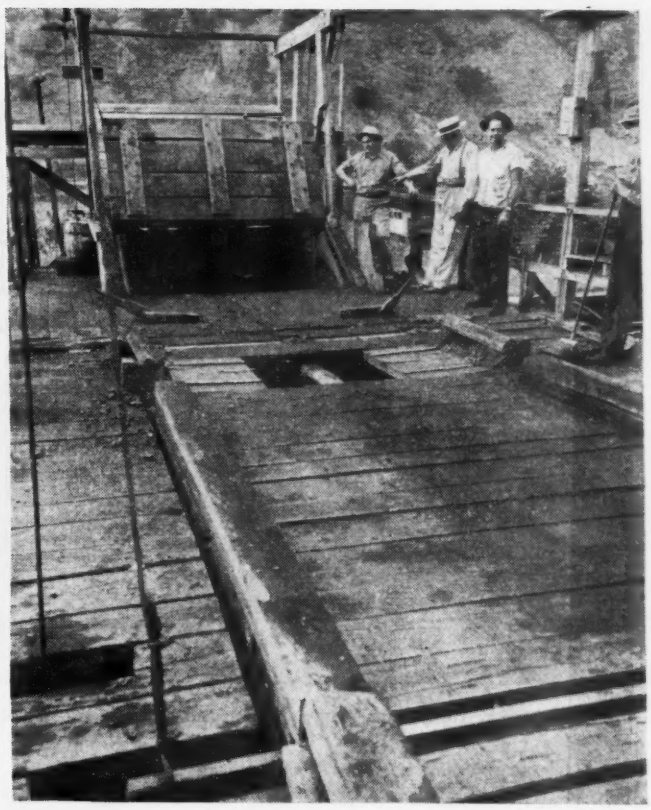
The unusual section of the dock, which loads the two tracks (see drawing), is 5 ft. higher than the flat dock which parallels one track for 84 ft. On this higher section, flat-bed trucks can dump to either track and a flat-bed and a dump-type truck can dump simultaneously to the track closest to the approach ramp (Track No. 2 on drawing). Moreover, dump-type trucks, dumping by their own hoists, can use the dock equally well and deliver to either track. Two methods of tilting the flat-bed trucks are used. In one the front wheels are run up a steep ramp, and in the other a platform on which the front wheels rest is raised at the approach ramp end by an electric hoist, tilting the truck.

If a flat-bed truck is to be dumped through Pocket B-C to Track No. 2 (see drawing) the truck is driven up the approach ramp front end first and stopped with its front wheels high on the incline. Doors B and C are opened and the endgate latch is tripped. The doors form part of the runway for the wheels and they must be closed before the empty truck can back down to move off the dock.

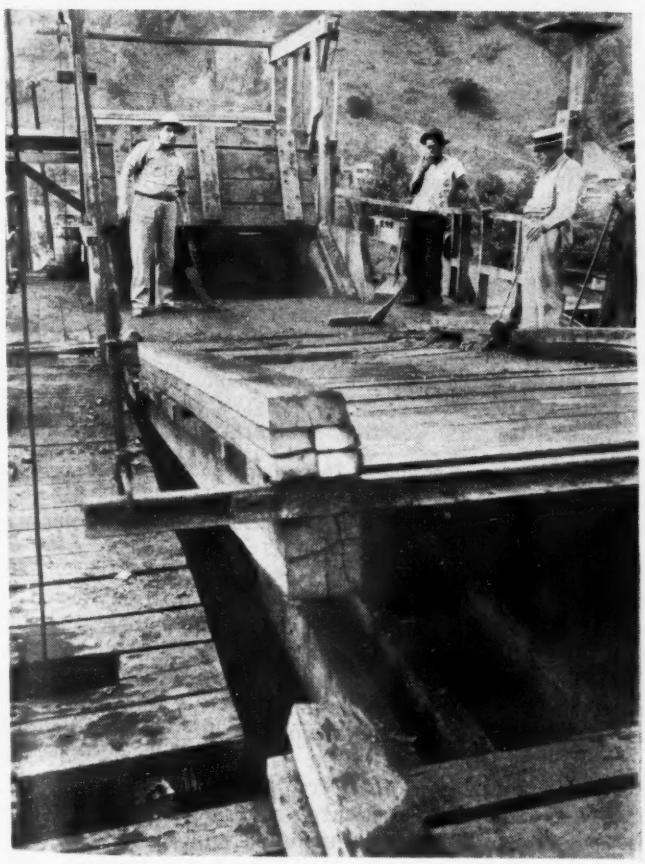
If a flat-bed truck is to be dumped through Pocket A to Track No. 1, it



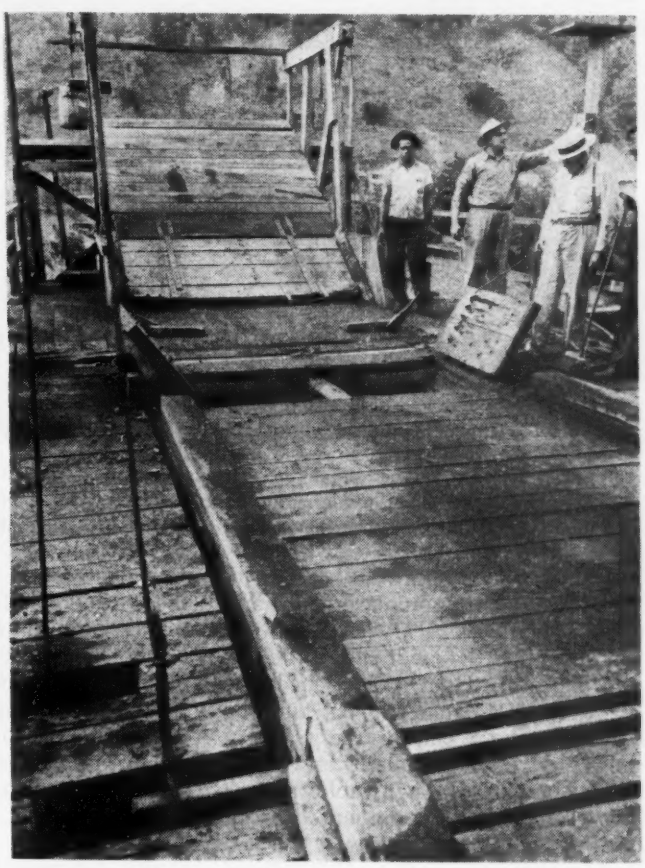
Dock section for flat-bed trucks. The platform is down and doors are closed for the next truck to drive on for unloading.



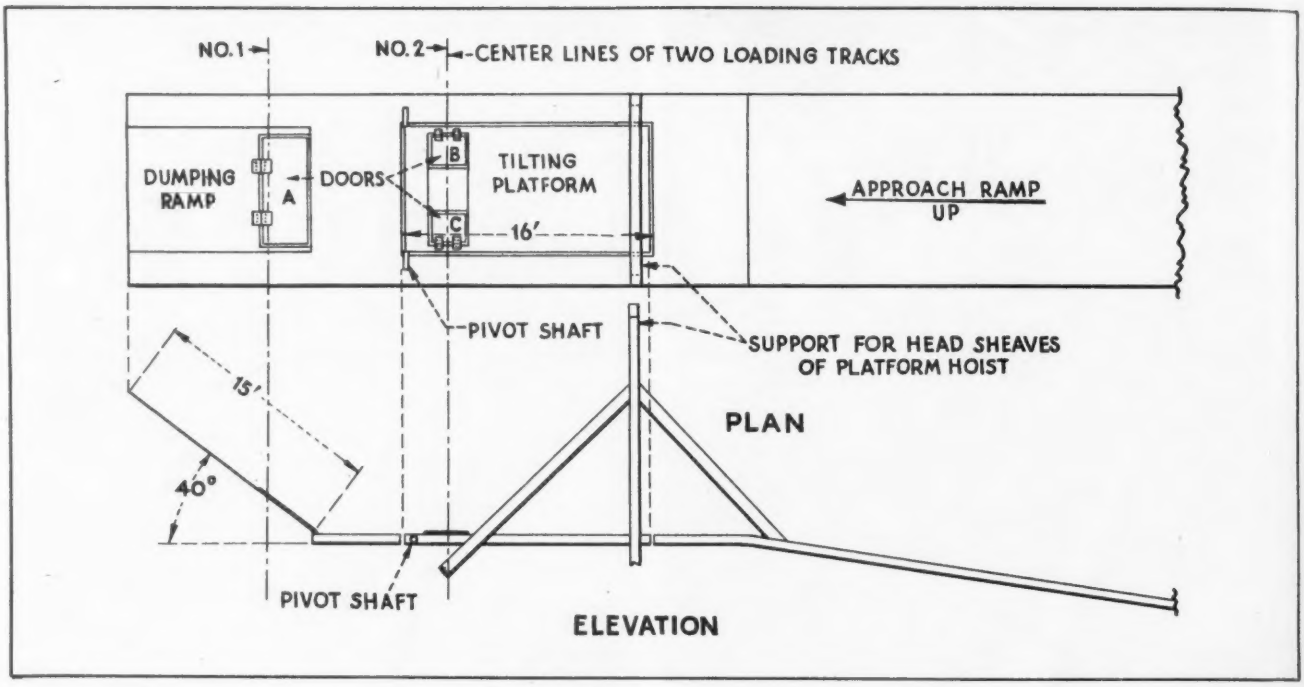
Door in dump ramp opened ready for a flat-bed truck to dump to Track No. 1 (shown in drawing).



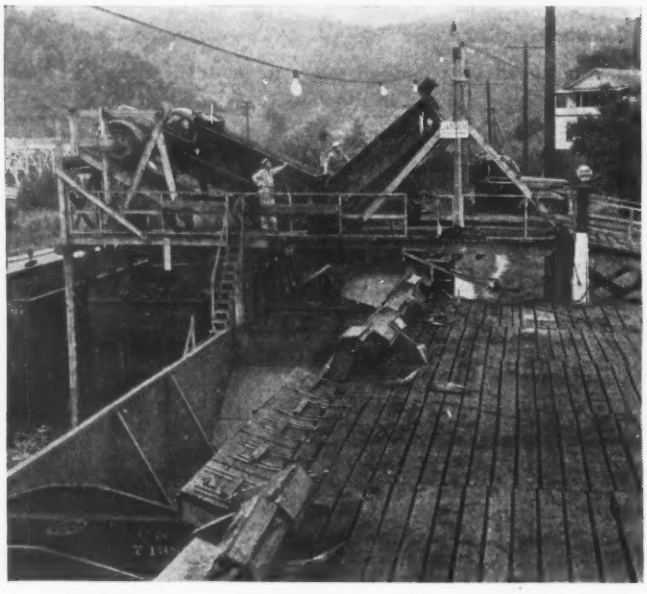
Illustrating the positions of platform and doors when dumping a flat-bed truck to Track No. 1 (see drawing). Door in dumping ramp is opened and the outby end of the tilting platform is being hoisted as if a flat-bed truck were in place for dumping.

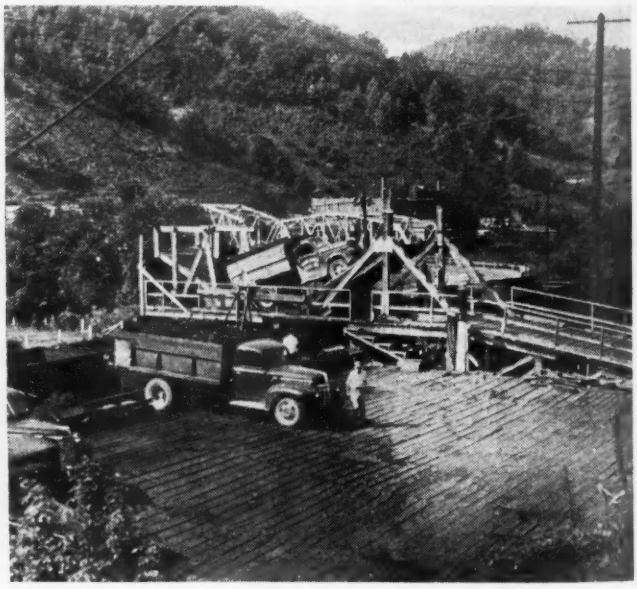


Illustrating positions when flat-bed truck is dumping to Track No. 2 (see drawing). Dumping ramp door is closed so front wheels can travel over it in mounting the ramp. After back wheels pass over Doors B-C (see drawing), they are opened.



How tracks, ramp and tilting platform are arranged for dumping either flat-bed or dump trucks to either of two tracks.





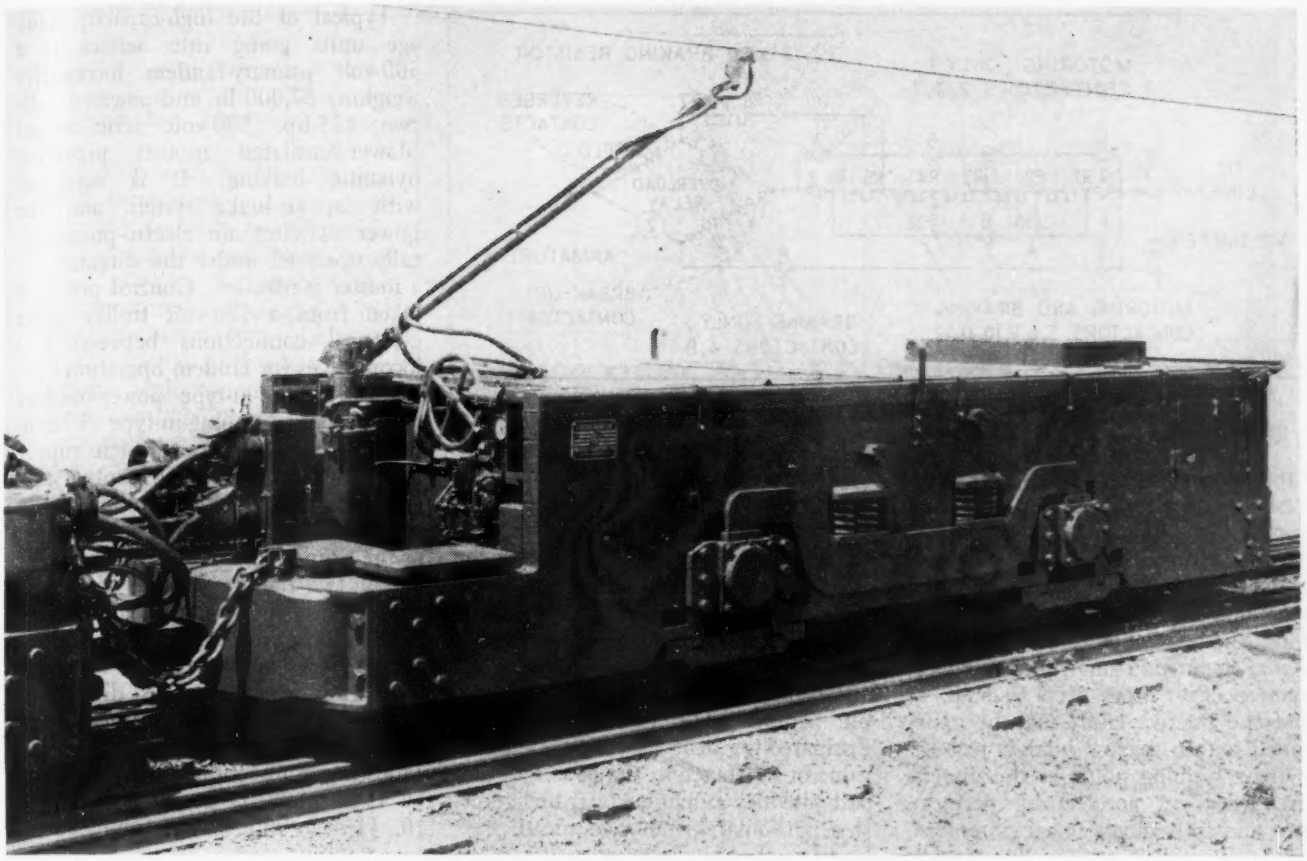
Left, close-up of a flat-bed truck on the dumping ramp and a dump truck on the tilting platform (in down position). Some of the flaps on the flat section of the dock are shown in raised and others in lowered position. These flaps enable the dump trucks to discharge to the center of the car; right, showing a flat-bed truck being dumped by being elevated on the tilting platform.

is backed up the approach ramp and stopped with its back wheels between Pocket A and the pivot end of the tilting platform. Door A is opened, the truck endgate latch tripped, and the approach ramp end of the platform raised to a 45-deg. angle by an electric hoist operating through cables passing over two head sheaves mounted on an overhead beam.

The accompanying illustration, showing seven trucks parked on the flat section of the dock, also shows on the other section a flat-bed unit on the dumping ramp and a dump truck on the tilting platform (platform not tilted), both dumping through Pocket B-C to Track No. 2. If a loaded dump truck develops hoist trouble, it can be emptied on the dumping ramp or on the tilting platform.

The approach ramp to the flat-dock section is from a paved street higher than the railroad track and so is only on a slight grade. Elevation of the top of this section is 12 in. above the top edges of the 55-ton hopper cars. The 84-ft. length of flat-dock section paralleling Track No. 2 is equipped with 21 46-in. flaps on 48-in. centers. To accommodate a dump truck a pair of hinged flaps is tipped to rest on the top edge of the railroad car and support the rear wheels of the truck.

Five railroad cars can be loaded simultaneously, three of them spotted along the flat dock and two under the other section. William King, superintendent of the Low Ash Co., designed and supervised building of the dock. Steve Hall is truck boss and mechanic. For the hauling from his Low Ash openings, Mr. Dalton uses Chevrolet 1½-ton trucks with beds carrying 6 tons of coal.



Primary-tandem haulage locomotive equipped with dynamic braking.

BETTER CONTROLS

Improve Haulage-Locomotive Operation

Optional Single-Unit or Tandem Operation Continues a Valuable Asset—Combining Advantages of Ten-Step Parallel-Motoring Control and Dynamic Braking in Simple System Offers Real Savings

By B. WOODWARD
Transportation Control Engineering
General Electric Co.

RECORD PRODUCTION for war has meant increasing the output of our mines. Stepped-up output under the prevailing conditions has required that haulage locomotives move a greater tonnage and handle it faster with less manpower. This trend is markedly reflected in the control equipments applied to new and rebuilt locomotives now going into service. Outstanding features of these improved control systems are tandem operation of locomotives, parallel-only operation of traction motors and dynamic braking.

Fundamentally, locomotives are combined in tandem to develop their tractive power more effectively under the control of one operator. In many mines established limitations on the size and weight of the single-unit locomotive have restricted the tractive effort to a lower figure than is economical today. Combining two units into a single locomotive overcomes these restrictions to a great degree. The most common combinations are:

1. Permanent-tandem locomotives consisting of two units—each with two traction motors—fitted with a single-station control equipment for the four motors. This arrangement is particularly applicable to rebuilt locomotives with little available space for additional apparatus.

2. Primary-tandem locomotives consisting of two identical units—each with two traction motors and complete with control equipment—arranged to be coupled together and operated from either of the control stations or to be operated separately as single units. This arrangement provides flexibility in haulage assignments and high availability of the units.

The haulage locomotive is regularly called upon to develop the last pound of tractive effort of which it is capable for starting and accelerating purposes.

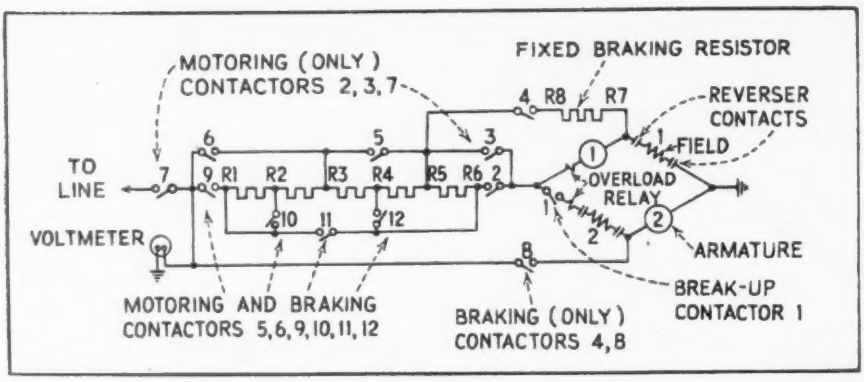


Fig. 1—Power circuits.

Parallel-connected motors, as contrasted with series-connected motors, possess the characteristic of losing less tractive effort by drivers slipping and overspeeding of one motor. From this it follows that parallel-only operation, under the control of an equipment designed to provide small increments of tractive effort from step to step, so that the tractive effort may be maintained within narrow bounds just below the slipping point of the drivers, gives excellent accelerating performance and fully meets the requirement.

The primary purpose of dynamic braking—commonly termed rheostatic braking—is to hold a trip on downgrade runs to a safe speed. It reduces mechanical braking on the wheels to effect a saving in wear of tires and brake shoes. Dynamic braking utilizes the series-wound traction motors as self-excited generators to provide braking action. The electric output is dissipated as heat in resistors. Each value of resistance in the generator circuit provides a definite retarding force at a particular locomotive speed.

Typical of the high-capacity haulage units going into service is a 500-volt primary-tandem locomotive weighing 37,000 lb. and powered with two 125-hp. 500-volt series-wound blower-ventilated motors providing dynamic braking. It is equipped with an air-brake system and the power switches are electro-pneumatically operated under the direction of a master controller. Control power is taken from a 500-volt trolley. The electrical connections between two locomotives for tandem operation consist of a plug-in-type power-bus-line jumper and a plug-in-type 19-conductor control jumper which supply the secondary unit with motive and control power from the trolley collector and master controller, respectively, of the primary unit.

The two traction motors operate in parallel for motoring and braking. Their armatures and fields are arranged in a diamond pattern in which each armature is connected directly to both fields with taps between them for external connections (Fig. 1). Motoring connections are established by Contactors 1, 2, 3, 5, 6, 7, 9, 10, 11, 12, and braking connections

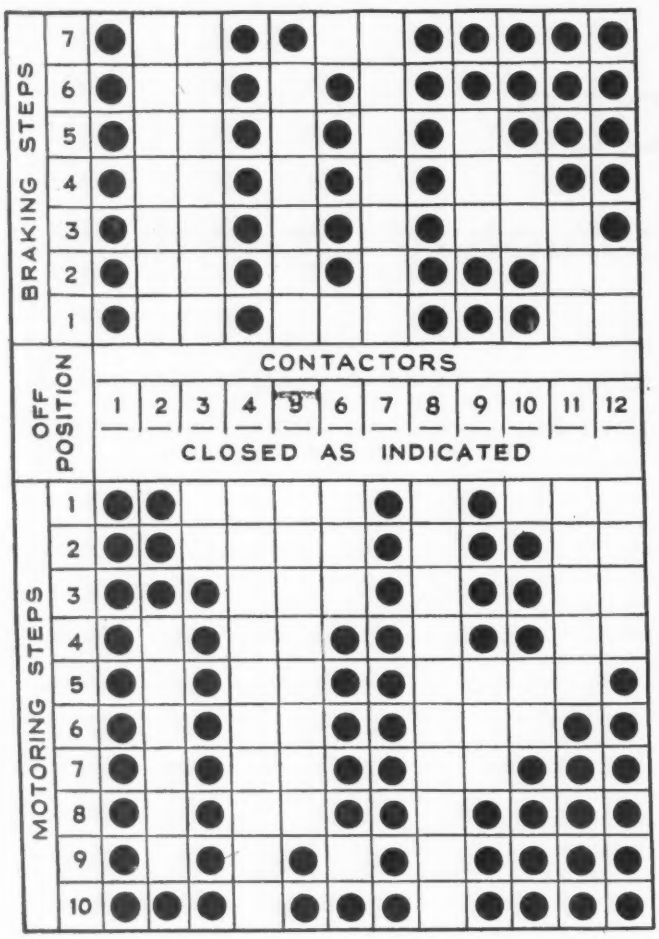


Fig. 2—Contactor sequence.

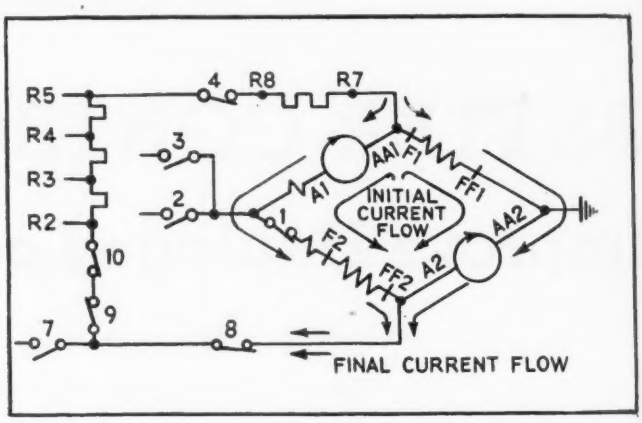


Fig. 3—First-step braking "For." connections with locomotive moving forward.

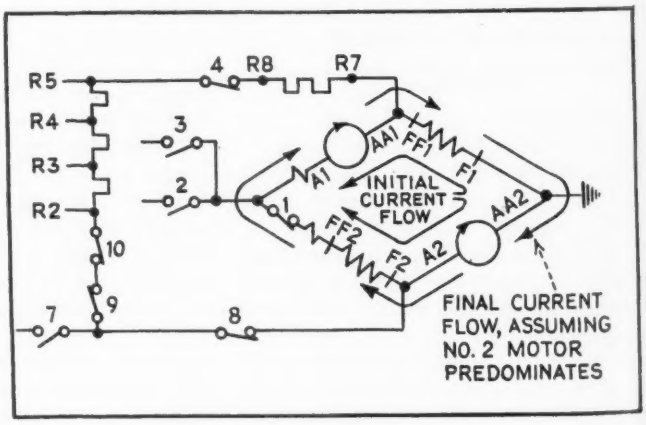


Fig. 4—First-step braking "Rev." connections with locomotive moving forward.

are established by Contactors 1, 4, 5, 6, 8, 9, 10, 11, 12, as shown in Fig. 2. An air-operated reversing switch connects the fields in correct relation to the armatures for directional determination.

The control equipment provides nine accelerating steps and one free-running motoring step by clockwise rotation of the master controller drum from "Off" position, and seven braking steps by counter-clockwise rotation of the drum from "Off" position. Braking is restricted to the last seven low-resistance high-capacity accelerating resistor combinations. Accelerating resistor sections R1–R6 inclusive, connected in various combinations, provide a series of evenly graded braking steps. A fixed resistor, R7-R8, is connected in series with the resistor R1-R6 to limit braking to a range of speed and braking effort suited to the specific service conditions encountered in operation.

A "break-up" contactor in the circuit of the paralleled motors prevents building up circulating current in the "diamond" network with consequent braking action when the locomotive is coasting in a direction opposed to the reverser setting. Electrical interlocking of key contactors and the reverser insures that the reverser contacts cannot open-circuit under load.

Protection by Relay

An overload-relay with a series coil in the circuit of each motor acts to deenergize the "break-up" line and Braking Contactors 1, 7, 6, 9, 4, 8. The purpose of the relay is to protect the motors and control apparatus against the continuance of excessive current resulting from a flash-over, a ground or a short circuit in the motors. The relay is set to trip at a value of current greater than can be usefully employed. It resets in the "Off" controller position.

An undervoltage relay controls Line Contactor 7 in such a manner that it cannot close in the absence of the operator and cause the locomotive to run away if the controller has been left inadvertently on a motoring notch after a power failure. It does not affect dynamic braking in any manner. The undervoltage relay drops out whenever there is an interruption of trolley power, and must be reset in the "Off" controller position.

The diamond arrangement of armatures and fields with two pairs of taps (Fig. 1) inherently produces either motoring or braking action from the two dynamos, dependent upon whether connections are completed to trolley power and to ground through

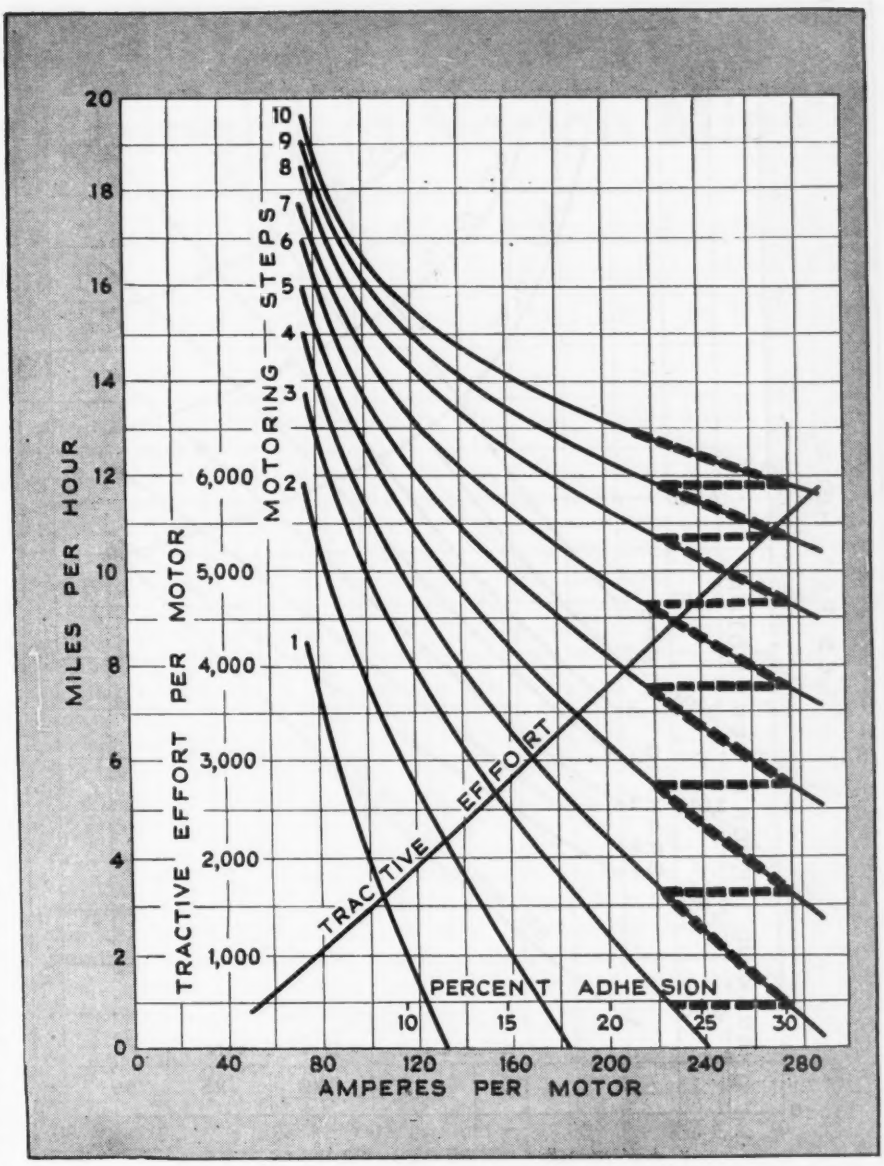


Fig. 5—Motoring characteristics.

one pair of taps or to a load resistor through the other pair of taps. The connections of armatures and fields, as established by the reverser for a given direction of armature rotation, remain the same for motoring and braking. Therefore, in changing from motoring to braking—or vice versa—during a run the controller reverse handle and the reverser remain fixed in their positions, so that the entire electrical control is centered in the one operating handle.

For controlled braking, e.m.f. builds up from residual flux. The armature current of No. 1 machine flows through the field coils of No. 2, and the armature current of No. 2 flows through the field coils of No. 1, and the machines become paralleled cross-excited generators with the braking resistor as a load (Fig. 3). The cross-excitation equalizes the loading of the two generators. It is not necessary to "flash" the fields with trolley power to effect rapid "build-up."

Going into braking with the reverser set against locomotive movement, the induced e.m.f.'s will oppose one another. Always one machine will predominate, "buck down" and reverse the flux of the other, whereupon the two machines will "build up" as series-connected short-circuited generators (Fig. 4). The overload relay will respond to excessive current and trip open the "break-up" contactor in the closed circuit. Then controlled braking can be established only after exciting the fields by a motoring application in the direction that braking is desired.

An 0-750 scale voltmeter, with a red danger zone beyond the 700 mark, indicates trolley or generated volts. This guides the operator so that he will not exceed the maximum permissible potential of 700 volts on the

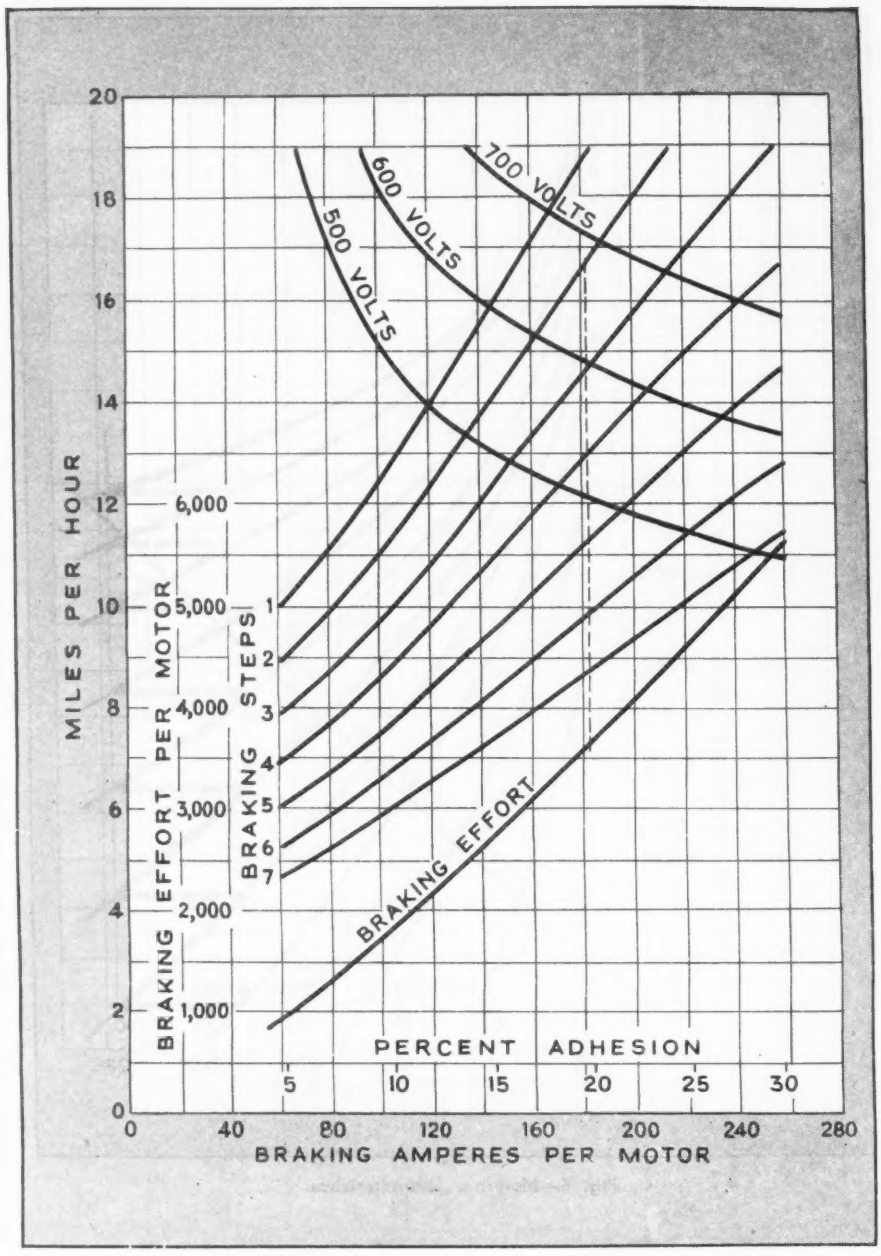


Fig. 6—Rheostatic braking characteristics.

motors when braking at high speed in service.

The motoring characteristics, plotted with m.p.h. as ordinates, and amperes per motor as abscissas, are shown in Fig. 5. Curves 1 to 9 inclusive are resistance steps, and 10 is the free-running step. A tractive-effort curve is plotted between pounds tractive effort and amperes per motor. The percent adhesion is indicated with respect to it. Assume that a 200-ton trip is to be started and accelerated to free running speed against a 1¼-percent grade by a single-unit locomotive where 8,000 lb. t.e. total, or 4,000 lb. t.e. at 210 amp. per motor (21.6 percent adhesion), is required to overcome trip friction and grade resistance, track conditions being such that the maximum tractive effort that can be developed is 5,550 lb. per motor (30 percent adhesion).

Notching the controller to Step 1, the tractive effort is 2,170 lb.; on Step 2 it is 3,370 lb.; and on Step 3 it is 4,700 lb. and the trip starts and accelerates to 0.8 m.p.h. where the tractive effort has dropped to 4,375 lb. At that point the controller may be notched to Step 4; 5,550 lb. t.e. is developed and the locomotive accelerates to 3.2 m.p.h. with decreasing traction. Then the controller may be advanced another notch without exceeding 30 percent adhesion. Notch by notch the trip accelerates to 12.9 m.p.h. free running speed.

From the foregoing it will be seen that the minimum tractive force developed at the "cut-back" points on the series of resistance steps limits the trip weight that can be accelerated against a given grade. Thus, the size and equality of the increments of tractive effort from "cut-back" point to wheel-slipping point, as determined by the number of accelerating steps and their resistance values, is a true measure of the accelerating ability of a control system.

The braking characteristics, with seven curves representing the braking steps plotted between m.p.h. and amperes per motor and a braking effort curve plotted between pounds braking effort and amperes per motor, the percent adhesion being indicated with respect to it, are shown in Fig. 6. Three voltage curves by their intersections of the braking steps show the speed and amperes at which the voltages are developed.

Motor Loads by Steps

These curves show that at a locomotive speed of 10 m.p.h. on Step 1 the braking load is 60 amp. per motor, equal to 875 lb. b.e. (4.7 percent adhesion); on Step 4 the load is 127 amp. per motor, equal to 2,350 lb. b.e. (12.7 percent adhesion); and on Step 7 the load is 218 amp. per motor, equal to 4,570 lb. b.e. (24.7 percent adhesion).

Assuming the net grade effect on a trip is 7,400 lb., or 3,700 lb. per motor (20 percent adhesion), a balancing retarding force will be developed when the motor output is 184 amp. each, which can be generated on several steps at different speeds, depending upon the value of the braking resistance in the circuit. For example, on Step 7 the speed would be 8.8 m.p.h.; on Step 4 it would be 13.0 m.p.h.; and on Step 2, at 16.7 m.p.h., the generated voltage would be 675 (interpolated from the 600- and 700-volt curves), which is close to the safe maximum.

The system of control described in the foregoing is equally applicable to a 250-volt locomotive.

The provision for optional single-unit or tandem operation of locomotives will continue to be a valuable asset. The superior accelerating performance of the ten-step parallel motoring control layout has proved itself on many properties. Now dynamic braking is coming into its own to effect savings in maintenance and to increase the ease and safety of operation. These two operating advantages have been combined in a simple positive control system that gives promise of a wide application in the mining industry.

PREFABRICATED TRACK
Boosts Loader Tonnage at Norton Mine*

Standardized Track, Cut and Marked in Advance, Adopted to Increase Output of Track-Mounted Loading Equipment—With 8-Ton Cars, Single Machine Averages 481 Tons per Shift in 6-Ft. Coal

By LINDSAY COBB
Assistant General Superintendent
Norton Coal Corp.
Nortonville, Ky.

PREFABRICATED track has been used at East Opening No. 2 of Norton Coal Corp., Nortonville, Ky., since the latter part of July, 1944. The longer we use it the more we wonder how we managed to get along on the old cut and try system. The story of the track is bound up with the loading and hauling equipment and gathering methods, and the story of one is the story of all.

We planned this mine for balance and in the hope of eliminating bottlenecks from the start. Haulage, including car changing, had been the chief of these bottlenecks where we used mobile type loading machines.

The new mine was opened in the No 11 seam, averaging 6 ft. in thickness. A very soft bottom caused us to check off as impractical the use of rubber-tired haulage. Being, we felt, tied to track haulage, we decided on Goodman track-loading equipment with Sanford-Day 8-ton drop-bottom mine cars. The heavy loading machine, weighing 17 tons, and the large car determined the weight of rail section —40 lb.—and also the maximum degree of curvature of the track. Realizing, therefore, that we were going to have to have track that always would have to be laid just so if we expected to keep the machine and cars rolling, the logical answer was to use switches and rail of standardized design to fit our panel layout, each curved rail curved to the same degree and each piece of rail, whether straight or curved, cut to standard lengths. We therefore drew up our panel plan and submitted it to the track manufacturers to develop the details and quotations for a completely prefabricated track job. The West Virginia Steel & Mfg. Co. got the order.

The track system is shown in the accompanying figure. We use a three-room key system, in which the center room of each group of three carries the main haulage road for the other two. On the panel drawing each rail is shown by a designated number. For instance, the standard curved rail to the left leading into a roomneck is shown as *TL*. The rail itself carries a welded nameplate marked TL. The right-hand standard curved stock rails are all marked TR and each TL and TR rail is the same length—20 ft. 6½ in. Every rail is marked in a similar manner with the exception of the standard 16-ft. straight rails and the standard turnout filler rails. There is a total of 52 different pieces of rail.

All turnout parts except curved stock rails are interchangeable for right- or left-hand turnouts. We use steel ties throughout—double rotary clip ties for curved track and single rotary clip ties for straight track.

Helps Engineer

You will note that this makes a very rigid layout. In other words, you have to drive your places to fit the track almost exactly. This lets the engineer relax somewhat as the track just about does the engineering. The track men had to study the blueprint pretty closely at first, but after a while they got to know it so well that now they never have to hesitate as to the next rail or switch to lay. We kept an engineer with them constantly for the first few weeks. We had a few headaches and arguments during this time because we had to do what some said couldn't be done—make entry track fit the key-room design.

Our first shipment of rail came in all for entry track and we couldn't get any more for two months. I'll have to admit that the first six or eight rooms don't look just like the print as to location of breakthroughs, but on the whole we got along all right with surprisingly few changes. In the first fall month—August, 1944—we loaded 21,253 tons of net clean coal by railroad weights with the one loading machine in 47 shifts, averaging 452 tons per shift. The average for November was 495 tons.

We also learned something else. Our rail friends, and machinery salesmen, too, had led us to believe that we ought to have six full key-room track sets, or 18 rooms of track for each loading machine. Our first track-loader came in when we had only three room necks turned, and we had to get along, as previously pointed out, for two months without any key-room track at all. It didn't take us long to find out that we could do pretty well on very few rooms.

Most of the time we have had only two sets of key-room track, yet we have cleaned up as high as 23 places in a shift. We have loaded as high as 720 tons on one shift out of six rooms, two entries and breakthroughs, and have averaged 481 tons of net clean coal by railroad weights per shift from the one track loader since Aug. 1, in limited territory.

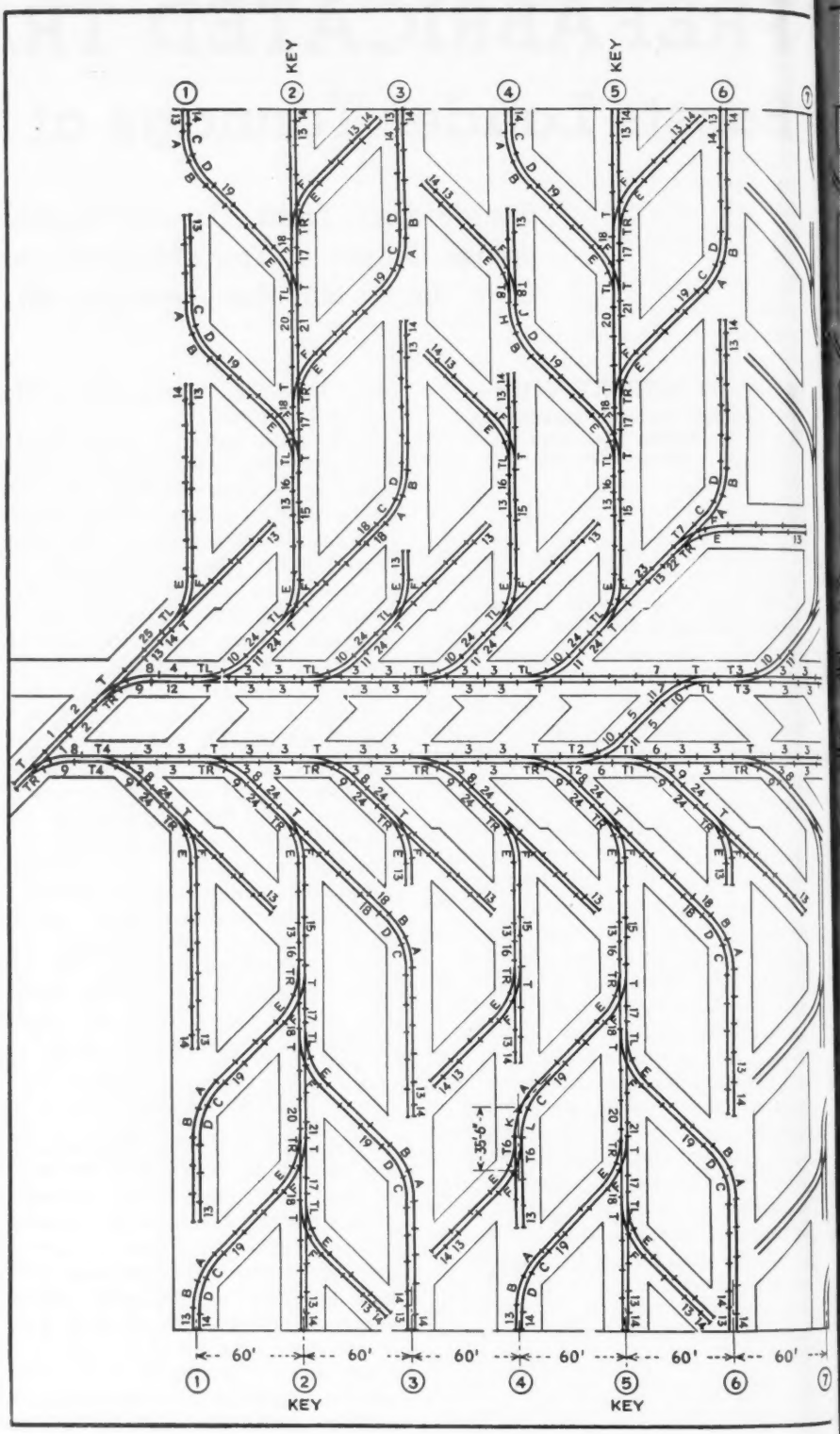
We are not advocating such restricted territory, as most of us believe we will do better when we have four key rooms working, giving us enough places so that we will have to cut each place only once each day, whereas we have had to cut each place twice and sometimes three times in a shift in the past. It may be that the shortage of territory does work to speed up the job to the extent that the loading crew always is on the necks—we generally call it something else—of the drillers and machine men. We make daily reports of all delays and one of the rarest is "waiting on coal." One shift reported a total of 45 minutes for the month of November from this cause, and the other had 90 minutes for the month.

As each key-room set of track costs approximately $3,000, there is another decided advantage in holding to a smaller territory. It doesn't take a financier to see that for six rooms you have $6,000 tied up in room

* Abstract of a paper entitled "Use of Prefabricated Track in Coal Mining," presented at the December meeting of the Kentucky Mining Institute.

Rail Lengths

Straight		Curved	
No.	Length	No.	Length
1	20′ 0″	8	18′ 9⅝″
2	19′ 7⅝″	9	16′ 5⅜″
3	18′ 0″	10	16′ 5⅜″
4	16′ 2⅞″	11	18′ 9⅝″
5	24′ 8⅛″	R1	18′ 4⅝″
6	11′ 5¼″	R2	18′ 9¼″
7	20′ 8⅝″	R3	19′ 9¾″
12	23′ 1⅛″	R4	20′ 2⅜″
13	12′ 0″	L1	18′ 4⅝″
14	8′ 0″	L2	18′ 9¼″
15	11′ 1¾″	L3	19′ 9¾″
16	4′ 2″	L4	20′ 2⅜″
17	7′ 6¾″	A	18′ 2⅞″
18	14′ 8¼″	B	16′ 6¾″
19	15′ ¼″	C	16′ 9⅛″
20	16′ 6¼″	D	22′ ⅛″
21	7′ 5¼″	E	17′ 11⅝″
22	8′ 2⅜″	F	14′ 4⅜″
23	11′ ⅞″	G	20′ 5⅝″
24	16′ 2¾″	H	17′ 2⅜″
25	13′ 1½″	J	12′ 4⅞″
		K	15′ 6¾″
		L	17′ 6⅞″

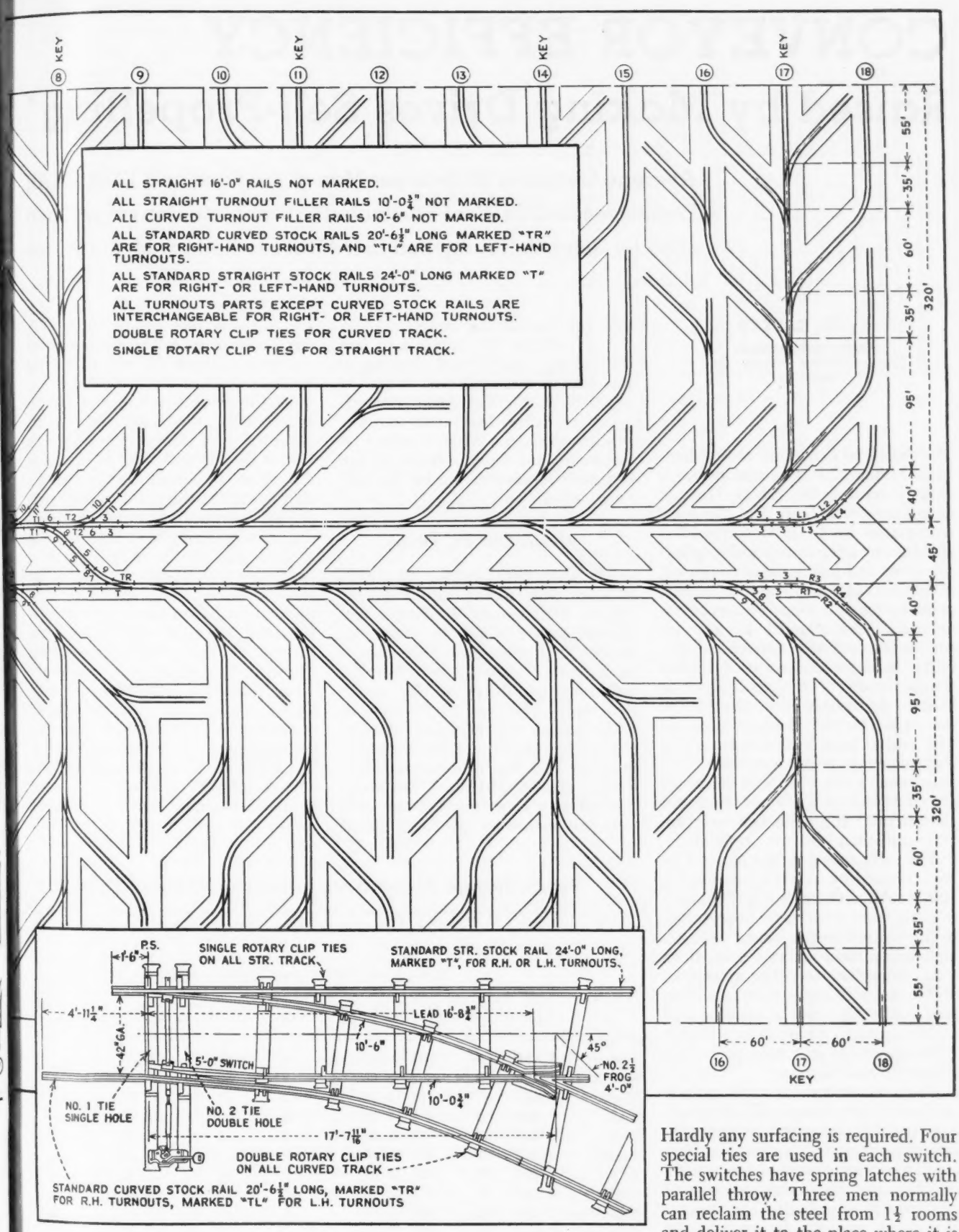


Panel and prefabricated tracks layout used by the Norton Coal Corp.

track, whereas for 18 you have three times as much. It may be we will do better with more territory. We have now settled on using four key sets, or 12 rooms, of track for each loader. So far, however, our monthly production hasn't been much better with twelve rooms than it was with six (487 tons in September and October).

We haven't heard of any other job with any better average tonnage per shift than we have gotten, regardless of number of working places, but we have heard of better one-shift records. Our coal is 6 ft. thick as a rule and we average about 32 tons out of a 25-ft. place with a 6-ft. cutter-bar. We generally clean up a room on four mine cars averaging about 8 tons of raw coal each. We are averaging close to nine of these cars per hour, the actual for November being 8.9 cars per hour throughout 22 shifts of eight hours each for the day shift, with 8.5 cars per hour for the night shift.

It is very rare that we have any lost time from derailment or other causes chargeable to track. For the entire month of November the loading machine, weighing 17 tons, did not once lose time from being off the track. The day shift reported a total of 112 minutes for the month because of cars off the track, and the night shift 77 minutes for the same reason, so we do have some wrecks. We have some grades as high as 4 percent and at such places we are likely to have trouble at the switches where one side is lower than the other, particularly if the bottom is soft at that point. We generally block up with planks under the low side. We also have to watch the loading so as not to put too much coal in one end, which tilts the car and occasionally slews one set of wheels off the tracks. When lost time from derailment averages month in and month out less than 5 minutes



per day, however, there can't be much complaint on track.

The track crew has averaged 3½ men per shift, laying up an average of 18 places per shift, including switches. The track tools consist of a wrench, a hammer and a blueprint. Track men also have a small push track on which they load the rail as it is taken up. Steel ties are spaced on 30-in. centers. Hardly any surfacing is required. Four special ties are used in each switch. The switches have spring latches with parallel throw. Three men normally can reclaim the steel from 1½ rooms and deliver it to the place where it is needed in one shift. To enable the loading machine to reach the coal when it is shot down, the track must be laid to within 5 ft. of the face before it is shot. We use short lengths at the face until we can replace them.

CONVEYOR EFFICIENCY

Raised by Making Drives Self-Propelling*

Average Output of 20 Tons per Man at the Face and 12.96 for All Employees in 42-In. Coal Facilitated in Complete Conveyor Operation by Using Self-Propelled Drive Units to Reduce Moving Time

By M. K. REED
Operating Engineer,
Turner-Elkhorn Mining Co.
Drift, Ky.

TURNER NO. 3 mine of the Sizemore Mining Co. is located in Floyd County on the Big Sandy Division near the town of Drift, Ky. The mine is operated by J. C. Cooley and is 100 percent mechanized, utilizing belt conveyors and Jeffrey chain conveyors, in addition to drives and attachments made in our own shop. These conveyors have been adapted to suit our particular needs of flexibility and mobility. No mine cars are used for the transportation of the coal, as it is handled exclusively from the face to the tipple by the various conveyors. The coal is hand-loaded upon a face chain conveyor of our own design and passes over a series of chain conveyors onto the cross-entry belt-line which discharges onto the main belt-line conveyor and then into the tipple chute.

The seam mined is the No. 2 Elkhorn, opened by a drift approximately 200 ft. above the railroad. The seam is fairly level with very little water. Average thickness is about 42 in., including a band of bone 4 in. thick 6 in. from the roof. The remainder of the seam is high-quality metallurgical coal. The roof is uniform and usually consists of blue slate, although in some sections it is sandstone. The bottom is hard fireclay.

The present lease is comparatively small and even though the daily tonnage could be increased by the addition of more units, no effort has been made to do so because of the scarcity of labor, etc. We think our over-all efficiency is very high. The average output per man-day for men at the face is 20 tons. The average tons per man-day, including all employees inside and outside the mine, is 12.96.

I will not go into detail as to how the cutting, drilling and shooting of the coal is accomplished, except to say that we use Goodman shortwall machines, Jeffrey hand drills and permissible powder. What I expect to emphasize are those features of our system that have improved the efficiency of our operation.

Rooms 800 Ft. Deep

The room-panel entries are driven in pairs with rooms turned to the left off the aircourse. Leaving a substantial barrier pillar, the rooms are driven 50 ft. wide on 100-ft. centers to a depth of 800 ft. Breakthroughs are turned and driven 90 deg. to the right only. They are 20 ft. wide on 50-ft. centers. As the room advances the breakthroughs are driven 50 ft. deep so that the next room, when driven, will intersect them. This, with the aid of a short line brattice, permits an abundance of fresh air at the working face at all times. Pillars 30x50 ft. are left standing and our recovery is about 70 percent on the average.

Our main belt conveyor is 850 ft. long, with the supporting idlers mounted on a wooden structure. The belt is 30 in. wide and is driven at 125 f.p.m. by a drive of our own design located at the point of discharge.

Maintenance costs of the belt lines due to overloading have been reduced to near zero by the installation of a small generator at the tail end of the main conveyor. This generator supplies power (when the main conveyor is started) to close and hold in contacts of starting switches controlling the operation of all inby conveyors. Thus, should the main conveyor stop, all the inby conveyor drives are stopped automatically. Then when the main conveyor is again started the generator activates all other switches five seconds later; all of which reduces our worries concerning conveyor overloading to a minimum.

Performance Summary, January-October, 1944

	Tons Produced	*Days Worked*	*Man-Days at Face*	*Tons per Man-Day at Face*	*Moving Equipment*	*Man-Days Constructing Belt Line*	*All Other Inside Labor*	*All Outside Labor*	*Tons per Man Employed*	*Number of Accidents*	*Man-Days Lost*
January	7,455	26	383	19.46	9	8	94	78	13.03	0	..
February	7,289	25	392	18.59	5	7	99	75	12.63	1	35
March	6,521	27	341	19.12	12	52	95	81	11.03	0	..
April	7,225	25	410	17.62	10	12	85	75	12.20	1	29
May	7,428	26	413	17.98	5	9	106	78	12.29	0	..
June	7,873	25	374	21.05	6	9	126	75	13.34	0	..
July	7,927	25	359	22.08	4	6	102	75	14.51	0	..
August	9,136	27	410	22.28	0	0	112	81	15.15	0	..
September	6,496	25	295	22.02	4	6	125	75	12.91	1	30
October	6,919	24	357	20.53	4	7	130	72	12.58	1	8
Total	74,269	255	3,714	20.00	59	116	1,074	765	12.96	4	102

Average tons per man-day at face	20.00
Average tons per man employed, including outside labor	12.96
Percent of total inside labor in moving equipment	1.2

* Abstract of a paper entitled "Mechanical Loading With Face Conveyors," presented at the December meeting of the Kentucky Mining Institute.

A 26-in. belt line 1,100 ft. long is in use on the cross-entry. Each time a new room set-up is made, the length of this conveyor is extended 100 ft., following the same plan of construction as the main conveyor. This belt operates at 175 f.p.m.

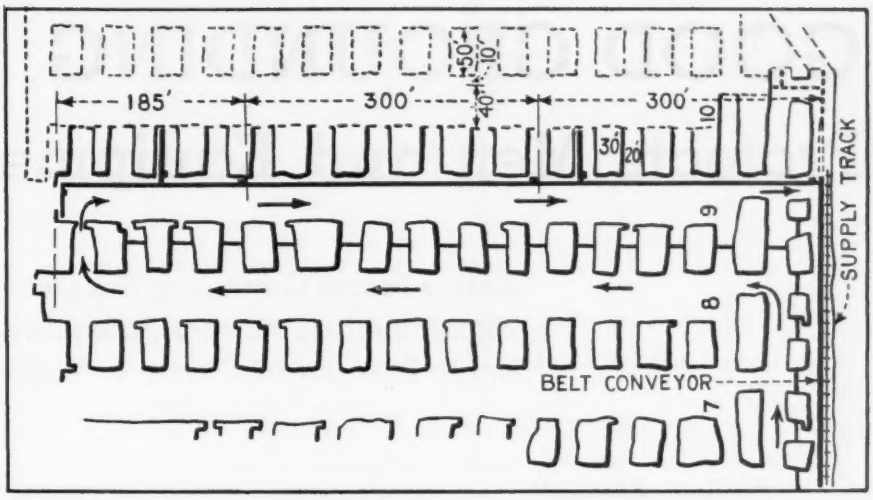
About five years ago Mr. Cooley decided that to increase our efficiency we would have to devise a quicker method of moving the equipment from one set-up to another. Consequently we mounted our drives on wheels with pneumatic tires, with a saving of approximately 67 percent in manpower required to make the move. Our actual moving time is 1.2 percent of all underground labor.

We use seven chain conveyors, four of which are 10 hp., two 5 hp. and one 2 hp. Our latest improvement is making our 10-hp. chain-conveyor drive electrically propelled. It is so constructed that one man can operate and steer it by use of steering gear similar to that used on an automobile. This drive, so mounted, is 14 ft. long, 5 ft. wide and 34 in. high, with a wheelbase of 54 in. It can be moved at a speed of 70 f.p.m. On long moves an additional man usually is necessary to handle the trailing cable while the units are being moved.

Mine Worked Two Shifts

The mine operates two shifts daily with nine face men, one supply man and one foreman on each shift inside the mine. On the outside we use one tipple man on each shift and one electrician and one superintendent daily, making a total of 26 men on the payroll. Five men are employed at the face of the 50-ft. room. They cut, drill, shoot, load, timber, pan up and move units from one set-up to another. Their shift is completed when they take three complete 6-ft. cuts from the room face. This normally is accomplished in about seven hours and the production from the room face is about 100 tons. Two breakthroughs usually are in the process of being driven as the room face is being advanced. Two men are employed in each breakthrough and their duties are the same as those of the men working at the room face. They take about 2½ cuts per shift which net about 75 tons. In this manner about 175 tons per shift is produced by the nine men. Approximately 7,000 tons is mined for each room set-up.

One supply man is used each shift. One-third of his time is consumed taking supplies, such as timbers, pans, chains, bits, oil, etc., to the working faces. The remainder is spent maintaining equipment.



Mining plan and conveyor layout used at Turner No. 3 mine

A standard 42-in.-gage track is laid parallel and to the end of the belt lines for use in transporting supplies and men. The rolling stock consists of a self-propelling electric track truck weighing about 1 ton which is coupled to two flat cars. Supplies are delivered by this equipment to the end of the belt line and from this point on are transported to the face on a rubber-tired pushcart preparatory to final use as necessary in mining.

On one of our recent moves from room to room we extended the belt conveyor, reset the heading conveyors and made a new room set-up. A total of 25 man-hours was used to move the chain conveyors and cutting machines; this included making the first cuts. Forty man-hours was used in extending the belt line and panning up the three room conveyors. The move was started at 6:55 a.m. with a crew of eleven men and two foremen and was completed at 12:15 p.m. The following time-study was made by J. A. Smith, engineer of the Jeffrey Mfg. Co.:

"At the beginning of the shift a crew of four men started moving the chain conveyors in the room, while the other nine men started to extend the belt. All of the chain conveyors were moved a distance of 1,982 ft. to their new positions by 7:55 a.m. The time for disconnecting the head pieces and moving them to the new location was one hour with a crew of six men. No. 1 conveyor was moved a distance of 112 ft.: No. 2 conveyor was moved 100 ft.; No. 4 conveyor was moved 700 ft. Conveyors Nos. 1, 2 and 4 are 10-hp. 61-AM's.

"Conveyors Nos. 5 and 6 are 5-hp. conveyors, 61-AM's. They were moved distances as follows: No. 5, 350 ft.; No. 6, 720 ft.

"After the crew of six men finished moving the conveyor head ends to their places, two of the men started helping on the belt extension while the other four men went back to the faces to get the three mining machines. They got the last machine to its new place at 9:40 a.m., total distance moved being 1,958 ft.

"They finished the belt extension at 10:30 a.m. Then nine of the men started panning up the chain conveyors. The conveyor from tail of belt to face of heading was 70 ft. long. The conveyor from cross-conveyor to face of room was 60 ft. long; the aircourse conveyor was 30 ft. long.

"The heading was ready to run coal at 11:15 a.m.; the room was ready to run coal at 11:25 a.m. and the aircourse was ready at 12:15 p.m."

Breakage Reduced

Mr. Cooley has developed a goose-neck-type extension to the 61-AM conveyor whereby the coal is deposited on the belt conveyor with a minimum of breakage and a minimum of wear and tear on the belt line itself. This is accomplished with the aid of two extra sprocket drives. This device also prevents much of the spillage on the return.

The safety record at this mine is excellent. We have not had injuries resulting from the movement of equipment since using the mobile-type conveyors, but previously we had a number of injuries, such as sprained backs, hernias, etc., due to the heavy lifting encountered.

Our experience convinces us that the future of conveyor loading depends on the development of the mobile-type equipment, thus avoiding the time lost while the conveyors are being shifted from one location to the next working place.

GOOD GROUNDING

Protects Men and Equipment in Mining

Safety Frame Grounding Supplements Good Insulation Properly Maintained as Further Safeguard to Men — Best Practice Normally Is Separate Circuit to Well-Bonded and Grounded Track

By PAUL M. BARLOW*
St. Albans, W. Va.

GROUNDING, as it is commonly known, is a much discussed subject in coal mining. In general, it has not been too well understood by those who advocate, install or use it. If misused, it can become a hazard. If properly applied, equipment is made safer for use.

There are many codes, rules, standards and laws that, in general terms, specify that "equipment shall be properly grounded," but very few give any information as to the way it should be done. The following discussion, based on many years of observing State-wide practices, is intended to point out a few well-tried procedures.

Fundamentally, electrical equipment is designed so that the current can be conducted through the motor or electrical device at will, with this current always held in check by the insulation around the conductor. When the insulation fails and the motor or electrical device becomes "grounded," the current is permitted to pass through the insulation from copper to iron and charge the frame. A man touching this charged frame and completing the electrical circuit or path by standing on a rail or moist earth, or by touching a pipeline or grounded bare wire, is easily shocked or electrocuted.

Shock or electrocution is a result of current flow through a person's body. This injurious current flow can be prevented in one of two ways: by insulating the man or by bypassing the unwanted current through a special grounding conductor. If either way is correctly followed no personal injury will result. Around stationary equipment a man can easily be protected by the use of insulation, such as platforms; but portable equipment is another matter, because surrounding conditions always are changing. A cutting machine without a safety frame-grounding wire may become charged and be operated for days on dry coal without harm to the operator. But sooner or later, when he reaches a water hole or some other conductor, he and possibly the machine will suffer.

If equipment insulation is regularly checked and properly maintained, the possibility of insulation failure is held to a minimum. Then, if the equipment becomes charged, due to accidental insulation failure while in service, a ground wire properly installed is a safeguard for the operator. Safety frame grounding, therefore, is the safest practice if properly done. But the grounding system must be complete to be effective and safe.

How Is Grounding Done?

To frame-ground a piece of equipment all that is needed is a length of wire of suitable cross-section to provide a reliable circuit between the machine frame and the earth. Such a circuit then bypasses any accidental charges to the earth. This connection sounds easier than it actually is, since inside a mine it rarely is possible to get a good earth connection at the face. Then, too, an external wire would be in the way and a burden to handle.

Good practice is to include the grounding conductor in the machine cable. Thus, the ground conductor completes a circuit back to well-bonded tracks, where normally the only stable grounding medium exists. In cases where the bonded track itself has a high resistance to ground it can be connected to earth at the drift mouth.

There are cases where rail resistance to ground may run as high as 16 to 20 ohms, but these may be lowered to the average range of 0 to 5 ohms by judicious grounding. In this regard the use of well casings and borehole casings may or may not be dependable. Experience has shown that location and seasonal variations greatly affect the resistance to ground.

While there may be cases where 600-volt mines can use unbonded track for frame-grounding in face areas and obtain a reasonably good measured ground, the practice should not be condoned. Frame-grounding always should be a conductor direct to well-bonded track, which in turn should be grounded.

In face or room areas, conveyor lines should not be made part of a power or grounding circuit. Only conveyor motors and control equipment need be grounded. The conveyor equipment outby the face area can be grounded by either a separate wire (preferably insulated) or one built into the power cable.

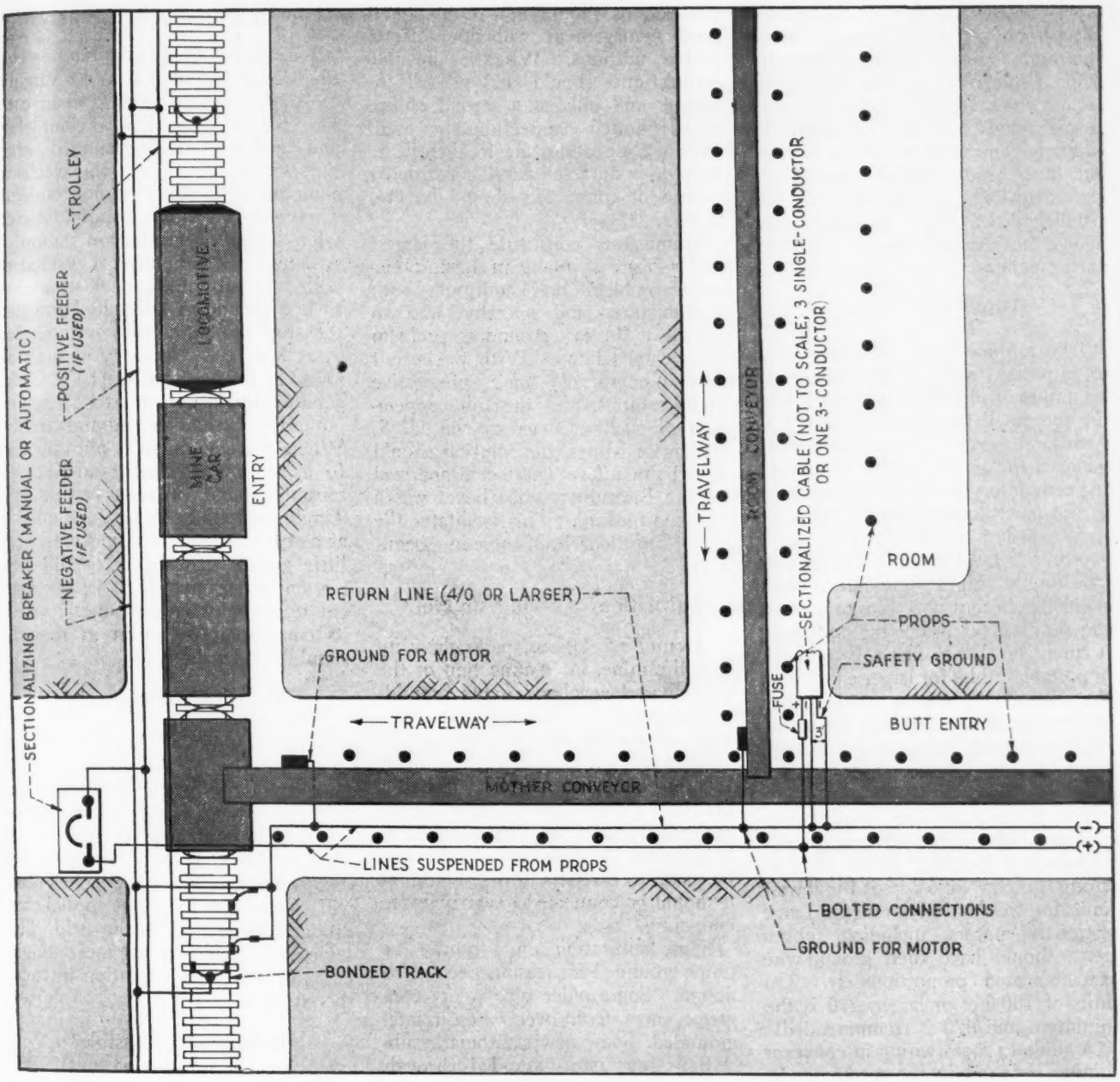
Short-Cut Grounding?

Since the negative wire of the conventional d.c. system returns to the rail, why not use this wire instead of running a third parallel wire?

If conditions were fixed and there were no slate falls, car wrecks, "self-appointed electricians" and the like, it might be possible to engineer a "short-cut" system. But because of the nature of coal mining this system is not dependable. A survey by the writer of coal mines using it showed that they actually experienced trouble and, surprisingly enough, many mines voluntarily discontinued the practice. It is obvious that if the frame is deliberately made a part of the circuit, and the negative connection is broken or knocked loose at the rail, the entire frame becomes "hot." If chain conveyors or shaker pan lines are interconnected when this happens, the charged mechanical equipment may cover a large area and present a large exposed surface at substantially line voltage.

Practically, an exception can be made along mother belt lines where

* Formerly electrical engineer, West Virginia Department of Mines.



One general plan for grounding equipment in a conveyor territory, showing equipment and circuit layout.

the negative is 4/0 or larger wire. This negative can be used for the dual purpose of power and as a safety ground wire to cross-entries or room-necks, provided it is properly spliced and mounted on timber and if there are at least two substantial connections to the bonded track on the outby end.

Why Not Use Pan Line?

In conveyor mining the pan lines, in many instances, run from the track to the face. However, since using shaker pan lines for grounding is almost an impossibility, a chain conveyor usually is meant when it is asked "why not use this line?"

Here again the "short-cut" method looks tempting and in practice might be a satisfactory answer to the problem except that bonded jumpers between pans and between pan units have been observed to break loose or, more often, are left off. It also is common to find many pan units loosely bolted. Progressive conveyor men tried this method early in the game but these same men have given it up as not dependable after several experiences with shock. Then, too, when the pan line is called upon to carry current, it introduces a spark hazard at the face in gassy mines and can induce unwanted currents in shooting cables strung along the pan lines. (Incidentally, a shooting cable of twisted-pair wires strung along the rib away from the power wires and equipment is safer than untwisted wire strung along power conductors.)

Where ground lines parallel pan lines they should be separate and strung on timbers. Although not generally advisable, there are cases where it is just as safe to attach the ground wire to the pan line. These would be the permanent well-constructed chain or belt lines well back from the face areas.

Along the same line of thought, how about the pipelines of sprinkler systems in the rooms? Admittedly these look good and are worth a try. They are used for frame grounding in several mines with satisfactory results thus far, especially where trailing-cable shuttle cars are used. However, like other mining practices, this method can become unsuitable or prove to be a hazard where misused. If pipelines

are to be used as ground conductors, they should be carefully installed along the room and away from the clearance side. Unions and rubber connectors should be carefully jumpered with special bonds, and the pipe should be properly connected to bonded track at the outby end. Water lines should be adequately cross-bonded if laid parallel to the track. Shooting cables should not be laid close to or under such pipelines.

What Size Wire?

The minimum size of wire used is an important factor in grounding. In a number of installations ground wires are too small to carry the current or withstand much mechanical abuse. In general, the ground wires or grounding conductors should be the same size as the power conductors. Otherwise, they may not be able to withstand a short circuit. Certainly the ground wire should be heavy enough to easily stand the current necessary to activate the short-circuit protective device, be it circuit breaker or fuse. Frequently, in portable cables for larger equipment the ground-wire size is smaller than the conductor size, but here the manufacturer should follow the Insulated Power Cable Engineers' Association standards.

For frame-grounding small pump motors, hoist motors, lights, telephones and the like, where external wiring is used, No. 6 wire is the lowest limit for mechanical strength. Large stationary motors, including substations, should have their ground-wire size increased proportionately. On units of 100 hp. or larger, 2/0 is the minimum and 4/0 is recommended.

A guide to room wiring in conveyor mining is found in the recommendation of the power committee of the American Mining Congress: "Minimum size of grounding conductor shall be as follows: if the rating of the fuse or circuit breaker protecting the cable does not exceed 200 amp., the minimum size of ground wire shall be No. 6 B&S gage; for values over 200 amp., but not exceeding 500 amp., the minimum size shall be No. 4 B&S gage." This, of course, does not apply to drill- and face-conveyor ground wires, which can be power-conductor size and can easily be supplied in the three-conductor cable. Many progressive companies have found it practicable to exceed these minimum requirements.

How About Connections?

What about mechanical connectors or terminals? Not enough importance has been placed on good connections at terminals. Loose wire and twisted connections should not be used and good management will not tolerate such conditions. Wherever possible connections should be welded or brazed, and only as a second choice should bolted connections be used. Where connections are frequently removed, durable well-constructed clamps or connectors should be provided.

Connectors constitute the largest single source of trouble in the portable-cable problem that confronts both manufacturer and operator, and in solving it the face-grounding problem can be solved too. With the recent developments of some progressive manufacturers, and the full cooperation of such agencies as the U. S. Bureau of Mines, the solution should soon be manifest. The recent approval by the Bureau of splice boxes was a big step forward. This facilitates the use of short lengths of cable in gaseous mines.

Substations—Ground or Not?

Around substations, particularly inside the mine, interconnection of the high- and low-voltage frame grounds to a wire going to bonded track represents a practice that as yet has developed no harmful results. While this practice is permissible, a better method would be to carry both grounds separately to a reliable ground or grounds. A high-voltage cable can be made to carry its own ground and it should be connected to earth at one end only.

Some substation units cannot be frame-grounded for reasons peculiar to design. Some older type rotary converters may flash over when frame-grounded. Some newer automatic substations are frame-grounded through a grounding relay. Mercury-arc rectifiers, when serving a trolley-positive system, cannot be grounded but they must be guarded. For proper protection, sets not grounded should have an insulating platform around them. The universal use of the negative as the grounded side of the circuit is recommended.

A grounded metallic plate should not be used in front of high-voltage switches. Safe mining practice calls for insulated platforms in front of all high-voltage switches, both inside and outside the mine. Rubber mats and belting do not always afford dependable protection against the hazards of either high- or low-voltage work. A rubber mat on concrete sometimes draws moisture. Where rubber mats or their equal are used, they should be placed on top of well-drained and properly insulated platforms to insure maximum protection.

How About Tipple Equipment?

Lack of proper safety grounding cost the lives of two men at West Virginia coal mines during 1942, and in each case the equipment was completely and properly frame-grounded after the accident. All tipple electrical equipment should be frame-grounded, whether it be a motor, conduit, starter, safety switch or pushbutton station.

Where all equipment is welded or bolted to substantial steel structures, such a ground is adequate, provided the steel structure itself is grounded in at least two places. Although allowed by the National Electrical Code, conduit should not be used for frame-grounding inside or around mines. Where the equipment is not attached to a continuous steel framework, a separate ground wire must be installed. Tipple grounding can be done quickly at a very moderate cost and with very little critical material. For full protection to personnel there is no apparent reason why such grounding, with its consequent reduction in hazards, should not be done.

What About Shovels?

The grounding of electrical shovels, especially those of the high-voltage type, requires particular attention. With the increased use of shovels in strip-mining and quarries, newer hazards are being uncovered. For that reason no one rule can be cited that will take care of the many special conditions encountered in the field. The services of a qualified engineer should be enlisted to find a solution in these special cases.

Is Summary Possible?

In summing up the subject of grounding it should be stated that both adequate face voltage and proper mechanical maintenance are necessary at all times for a successful mechanical mine; otherwise, the refinement of grounding can have but little meaning.

Good voltage allows protective devices to work quicker and thus insures greater safety.

While it may be true that grounding does not always guarantee full protection of equipment, it can be relied upon for greater personal safety.

Many practices safe in one mine may not be safe in another, for reasons that may not always be apparent.

No short cut or easy formula can be given. The safe plan is to have the electrical engineer review conditions and help set up a schedule of regular tests and inspections for the electrician.

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THE FOREMEN'S FORUM

One-Way Ventilation's Pros and Cons*

Reduced Opportunity to Split Air Restricts Such Ventilation to Mines Where Crop Lines Are Convenient or Airways Are Numerous

THOUGH the system of moving air known by many names as "one-way, direct, or through ventilation" will save one-eighth of the power or even more because of the absence of leakage, it has even further advantages over "two-way, return, loop or circulating" ventilation.

These advantages are: (1) More of the coal dust is carried to the surface and is not spread, as in loop ventilation, in the return airway of the mine; (2) only the particular heading on which cars are hauled accumulates coal dust and so needs to be rock-dusted repeatedly; (3) fewer stoppings need be maintained, at least in good condition; (4) if an explosion occurs, it may be possible (a) for beleaguered men to leave by these remote surface openings instead of having to pass through the explosion-polluted mine, and (b) it may be possible also for rescuers to enter by these same openings; (5) the methane and coal dust of the return airways are eliminated, thus removing a place that is as long as the mine roadway and one that usually is full of gas and coal dust and has, therefore, maximum potentialities for mischief; such returns are difficult to rock-dust and too often are veritable powder magazines; (6) there will be no likelihood of air recirculation between main intake and main return when the openings to the surface are located far apart at the front and rear of the mine and (7) the contraction following an explosion will draw in much outside air, and thus there will be only a small low-pressure area to which the combustion products of the explosion can return. A return wave of polluted air will be possible only if the explosion is in one of a few locations, for fresh air will enter and largely block the return of the combustion gases created by the explosion.

Where This Plan Hurts

The objections are: (1) that after an explosion there will be more natural ventilation than is present in a mine with loop ventilation, and polluted air will be more widely spread thereby; and (2) that, in normal times, the natural ventilation resulting may make the quantity of delivered air unequal, at times aiding and at times opposing fan ventilation; (3) that where the elevations of inlets and outlets are markedly different, regulating the ventilation will be difficult and capricious. In Fig. 1, most of the regulators are omitted. Where they should be placed and how wide their restrictive openings should be will be a matter for trial and error and dependent on the natural ventilation available, if any; (4) there can be only as many separate air currents as there are single passages from the surface—that is, headings carrying air. Because, at contiguous points in paralleling headings of any given entry, all the headings are roughly at the same pressure, there will be no marked drop of pressure at adjacent points in the entry as is found and utilized when the main current itself is looped, that drop providing the power for actuating the air in the looped split.

Relative to objection (4), by narrowing a place or driving the straight airway narrow for a distance, the air could be split, it is true, and forced into a side heading, but, as there is but one entry available, it

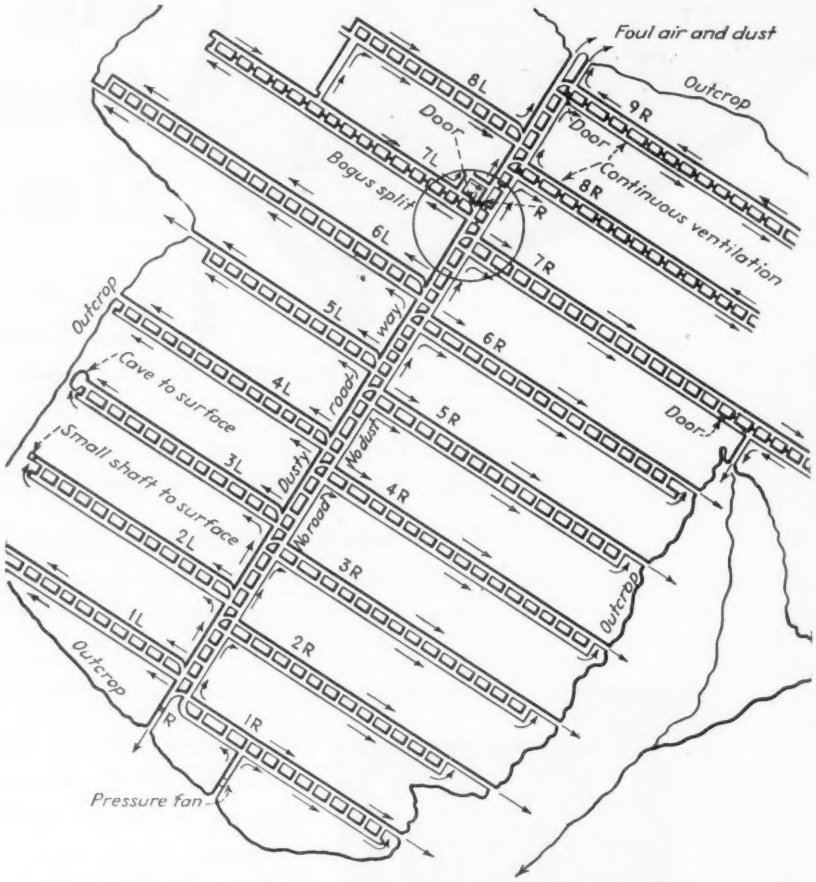
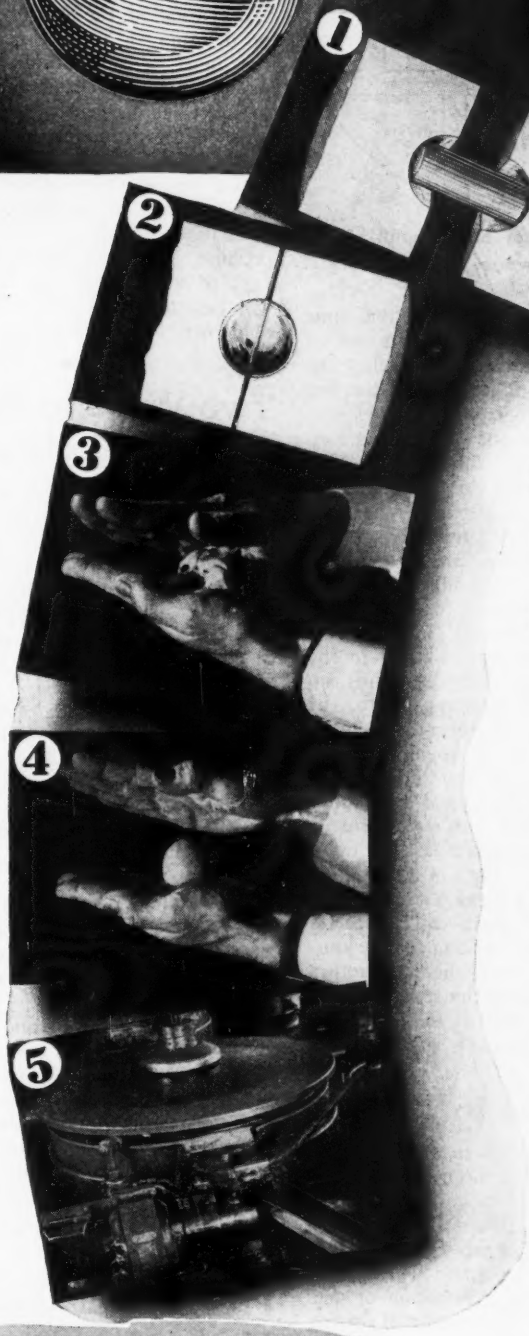


Fig. 1—Favorable conditions for one-way ventilation and for safety. Of course, not all the headings will be operating at the same time, so the ventilation arrows show only what can be done when such ventilation is needed.

* Further development of a study of one-way ventilation that appeared in *Coal Age*, July, p. 88.

But how do they make 'em so ROUND?



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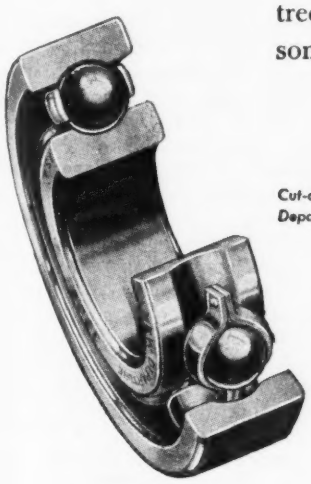
Meanwhile, remember that every mechanical device that helps make our civilization possible, has ball bearings in its family tree—somewhere—somehow!



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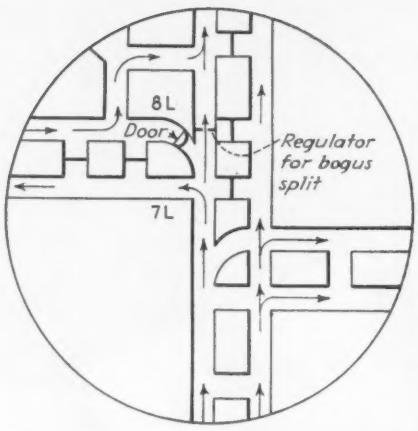


Fig. 2—Illustration of bogus split, shown in Fig. 1, but drawn on a larger scale.

would all return eventually to the same straight airway and would militate against using the air in that straight heading for any other workings unless, indeed, the two air currents were together to travel past only the limiting number of working men (and animals, if any). In that case, it might seem simpler, if not better, to use a continuous current instead of a bogus split, for that is the correct designation of such a ventilation unit, because it ventilates two entries. It does not even permit of dispensing with a door.

Limitation (4), however, matters little if a series of entries happen to go to the outcrop or are directed thereto, thus admitting air from, or emitting air to, the surface by one, two, three or more headings. Such a mine is said to be operating in a "potato hill." You may find that this limitation is more theoretical than practical where the room headings naturally break through to the surface, as they do so often in this country. Both or all headings of an entry need not break all the way to the surface. One of them will suffice for more than one split, so long as the junction is beyond the point where the return of the side entry rejoins the straight entry, for there no men or animals will be present to be counted as occupants of that single air current.

One Heading per Entry

Where there are a dozen or more headings from a dozen or more room entries striking the outcrop in a dozen or so places, there can be two dozen or so separate currents of air in the several working sections, and a big prodution will be possible despite the restrictive action of one-way ventilation, but the expense of driving and timbering some or all of these through to the surface and the necessity for speeding the headings of the entries to daylight so as to reduce the burden on the fan and to reduce the number of entries on continuous ventilation may be regarded as a fifth and sixth disadvantage of this system. It must be remembered, however, that these many openings greatly increase mine safety and usually are not unduly expensive. With the face entries alone breaking through to the outcrop, the use of the one-way current may be expensive or impossible, but many mines are so circumstanced that they could throw away their boosters by adopting one-way ventilation.

A seventh disadvantage, while driving toward the outcrop, is the dependence on doors at the mouths of side entries where the main entry has one-way ventilation. Doors always are likely to be left, or propped, open and are subject to leakage.

Before a decision is made to adopt one-way ventilation, the plan of campaign must be determined, and the needs of the system must be kept constantly in mind. It may be necessary to maintain the brattices erected in driving to the surface or prior to the introduction of one-way ventilation and, in fact, their removal usually is not desirable even where they separate two headings of an entry where the air at contiguous points is at about the same pressure. But these brattices need not be kept in good condition, for the leakage will be small with such a small pressure difference.

•

Two Ways to Stop Mine Explosions

Safety in the use of explosives that are sheathed with a heavy coat of dust which reduces the temperature of the flame when, on detonation, it emerges from the cartridge, probably is increased by inserting into the shothole a plug of incombustible, like clay, before pushing in the cartridge, thus preventing the shot from projecting flame toward the remote end of the drillhole, declares the Safety in Mines Research Board of Great Britain in its 1943 report. Such boreholes would be stemmed both front and rear.

Experiments are being made to find or develop dusts that will erode readily in a blast of air and so will be speedily lifted when an explosion occurs. Dusts that erode rapidly include certain byproducts from rock-crushing plants and some chemically prepared dusts, which are free flowing and have few excessively fine particles.

They may be made from ordinary dusts by the removal of such fine material. Most of the dusts commonly used can be regarded as intermediate between freely eroding dusts and sticky dusts that resist at first and give way suddenly and completely when the denuding current reaches sufficient strength. Ground limestones have sticky characteristics.

•

Prepare for the Moments of Decision

First aid in accident has obtained a great deal of consideration but less attention has been given to what may be regarded as a more important consideration —action in face of impending disaster. What to do when the fan stops, when a door is left open, when there is a mine fire or an explosion, and when an area has to be sealed. In any such event, except perhaps a fan stoppage, no one is quite clear what should be done. As in first aid, the problem must be solved by the man on the job, usually not a technical man, but one poorly equipped and often uninstructed.

The U. S. Bureau of Mines men and the mine inspectors who know many of the answers will arrive as fast as planes and trains can bring them, often only after the wrong answers have been given by the men on the job and disaster has been invited thereby. The foremen, superintendents and managers come in between, but, after all, it is the men on the job who know the conditions best, what door was open, what brattice was down, where the methane was in excess, what was being done about it. Thus knowing, they should also know how to cope with them, and they sometimes have the problem standing starkly before them even before the disaster occurs. They perhaps can avert the disaster. Others can do little more than pick up the pieces, and in so doing may snuff out more lives that might have been saved. Fate puts the problem up to those less competent to solve it.

Easy is it for men not having studied the problem to turn polluted air onto immured men. How often such a misadventure of judgment has occurred will never be known, and when it has been done there always is an uncertainty as to whether the men died from this misjudgment or from conditions beyond anyone's control. Uncertainty makes kindly men draw a veil over the methods adopted and the opportunities missed.

•

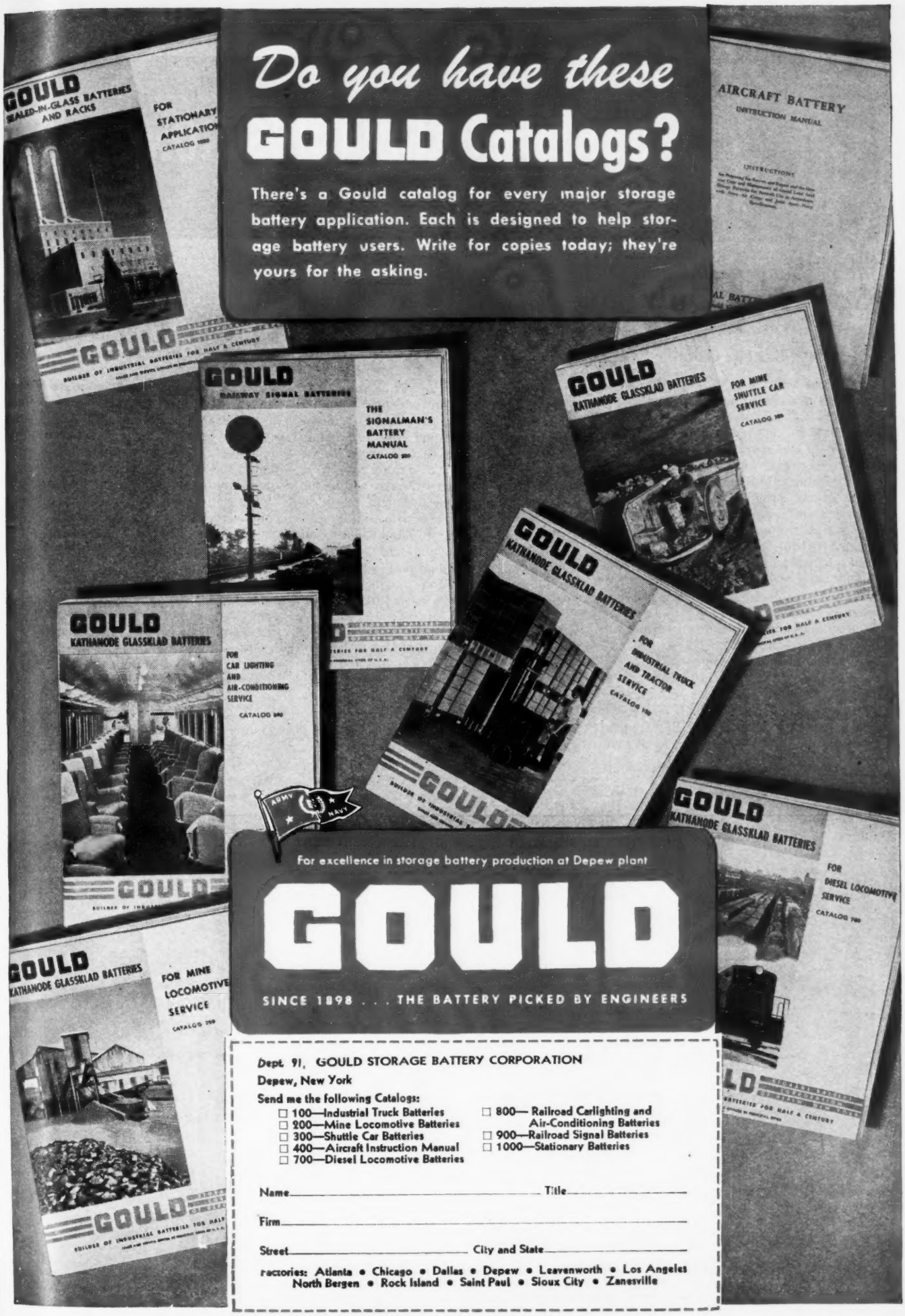
Carbon-Dioxide Frost Circumvented

I have read the interesting article on "Extinctive Gases to Subdue Mine Fires," appearing in your Foremen's Forum, October, 1944, issue, p 112. Mention is made in that article of the freezing of the gas when carbon dioxide is discharged, but it should be stated that this will occur only if standard cylinders, as provided for soda-water use, are provided. Cylinders for fire-extinguishing purposes are equipped with siphon tubes which draw the *liquid* carbon dioxide from the bottom of the cylinder, and no freezing will occur when such cylinders are used, so long as proper discharge nozzles are provided at the end of the piping.

This use of carbon dioxide *liquid* is one of the basic principles in the carbon-dioxide fire-extinguishing systems which are in use for protection against a wide variety of fire hazards involving gasoline, paint and other flammable liquids, and for the protection of ships, airplanes, electric generators and other equipment.

Furthermore, it should be mentioned that a smaller volume of extinctive gas is needed to prevent combustion or explosion if carbon dioxide is used instead of nitrogen. The exact figures are given in publications by the U. S. Bureau of Mines and by the National Fire Protection Association.

H. E. Heigis
Manager, Engineering Dept.
Walter Kidde & Co., Inc.
Belleville, N. J.



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STATE-BOARD QUESTIONS

Coal Age Quiz*

Mine-Fire Gases

Q.—What gases and vapors may be expected to occur in mine fires?

A.—Gases (1) of combustion, (2) of low- and of high-temperature distillation and (3) of the water-gas reaction, in addition to the gases and vapor found in a normal mine atmosphere. (See table for some of the principal of these. Col. 7 shows what usually are termed boiling points, the temperature at which a liquid is converted to a gas at the pressure of the atmosphere. Note that butylene, propane, butane and even pentane are stated in Col. 3 to be gases, though the last two are not gases at 32 deg. F., the freezing point of water, but become so before 100 deg. F. is reached, that being the temperature assumed for the inclosed area.)

It will be seen that the fire gases are many and varied, and while perhaps they will never in themselves be in concentrations enough to be explosive, though that might be questioned, they may be in such concentration that they will seriously modify the limits at which methane will explode. Many are liquids at mine temperature, but they are violently explosive in relatively low concentrations. Some doubtless become liquid and fall before they leave the area that is about to be sealed, but as they fall a long way from the fire their presence as liquids within the area sealed or to be sealed may not be of significant importance. But, after sealing, their conversion to liquid form will add a little to the vacuum behind the seals, though the vapors doubtless are less important in volume and weight than the gases that will remain gases after the fire is cooled.

It will be noted how readily carbon dioxide is dissolved in water, especially at 32 deg. F. At 68 deg., which is less than the temperature of inclosed area (in fact just about room temperature), only half as much dioxide is dissolved as at 32 deg. It is clear that as the temperature falls the more dioxide will be dissolved by the water present if any such water there be. Note that 1,944 times as much carbon dioxide is dissolved at 32 deg. F. as at 102 deg. F. But it must be remembered that these facts and figures are true solely of distilled water and will have to be modified on application to the water of the mine.

As water evaporates at temperatures below 212 deg. F. and becomes water vapor, and continues so to act after its temperature falls below 32 deg. F., when it turns to a solid, so do these other liquids and solids, and if the air is not saturated with the compounds, they will not become liquids and solids until such saturation is completed. Not only do we have to be on our guard because the temperature in places may be well over 100 deg. F. but also because the vapors will continue to remain in the air after the temperature has fallen below their boiling points, which points are not points at which evaporation begins but points where vapor is evaporated at atmospheric pressure. For these reasons, most of these organic compounds continue to be vapors and continue to lower the explosive limits of the atmosphere of the inclosure as the temperature falls.

Observe also that the vapors will not fall readily as a dew when of low concentration nor will they be dissolved by water at the high temperature of the inclosed area.

*Continued from November, 1944, *Coal Age*, p. 104.

SOME MINE-FIRES GASES WITH A FEW OF THEIR PERTINENT CHARACTERISTICS

Name of Gas or Vapor (1)	Chemical Symbol (2)	Gas or Liquid at Assumed Temperature of Sealed Area (100 Deg. F) (3)	Specific Gravity: When Gas is compared with Air as 1 (4)	Specific Gravity: When Liquid is compared with Water as 1 (5)	Liquid Boils or Gas Liquefies at the Degree Fahrenheit Indicated below (6)	Cubic Centimeters of Gas That Will Dissolve in 100 Cubic Centimeters of Water (7)	Lower Percentage Limit for Combustion Upward in Normal Air (8)†
Gases of Combustion							
Carbon dioxide	CO_2	Gas	1.5282		−109.3	179.7 at 32 deg. F. 90.1 at 68 deg. F.	Inexplosive
Carbon monoxide	CO	Gas	0.9672		−313.6	3.5 at 32 deg. F. 0.0018 at 102 deg. F.	13.1[a]
Water	H_2O	Liquid		1.0000	+212.0		Inexplosive
Gases of Distillation (Low- and High-Temperature)							
Hydrogen	H_2	Gas	0.06959		−423.0	1.93 at 32 deg. F. 0.85 at 144 deg. F.	4.15
Methane	CH_4	Gas	0.5543		−258.5	5.45	5.40
Ethylene	C_2H_4	Gas	0.978		−154.8	25.60 at 32 deg. F.	3.13
Propylene	C_3H_6	Gas	1.498		− 52.6	44.60	2.21
Butylene	C_4H_8	Gas	0.668		+ 23.0	Insoluble	1.80
Benzene	C_6H_6	Liquid		0.878	+175.3	0.07 at 62.8 deg. F.	1.45[b]
Ethane	C_2H_6	Gas	1.0488	1.36	−126.9	Slightly soluble	3.15
Propane (traces)	C_3H_8	Gas	1.558	1.414	− 48.1	6.50 at 57.2 deg. F.	2.4[c]
n-Butane (traces)	C_4H_{10}	Gas	2.046		+ 33.1	Insoluble	1.90[a]
n-Pentane (traces)	C_5H_{12}	Gas		0.631	+ 97.3	Insoluble	1.43
Toluene	C_7H_8	Liquid		0.866	+230.9	Insoluble	1.31[b]
Orthoxylene	C_8H_{10}	Liquid		0.879	+291.0		
Metaxylene	C_8H_{10}	Liquid		0.865	+282.5		
Paraxylene	C_8H_{10}	Liquid					
Naphthalene	$C_{10}H_8$	Solid Melts at 176.2 deg.		1.145	+424.2	.003*	
Gases of Reaction							
Carbon Monoxide	CO	Gas	0.9672		−313.6	3.5 at 32 deg. F. 0.0018 at 102 deg. F.	1.31[a]
Hydrogen	H_2	Gas	0.06959		−422.9	1.93 at 32 deg. F. 0.85 at 144 deg. F.	4.15

Col. 7: *Grams, not cubic centimeters, of naphthalene in 100 c.cm. of water. Col. 8: †These figures, except where otherwise noted, are based on tests made with tubes of 5 cm. (1.97 in.) diameter and 150 cm. (59.05 in.) long with firing end of tube closed, and half saturated with water vapor [a]2 in. tube, length not stated, firing end closed, air fully saturated at 57 to 58.6 deg. F.; [b]dry air; [c]2.5 cm. (0.98 in.) diameter tube and 150 cm. (59.05 in.) long, with open firing end and saturated air.

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November 10, 1944

Mr. W. H. Richardson
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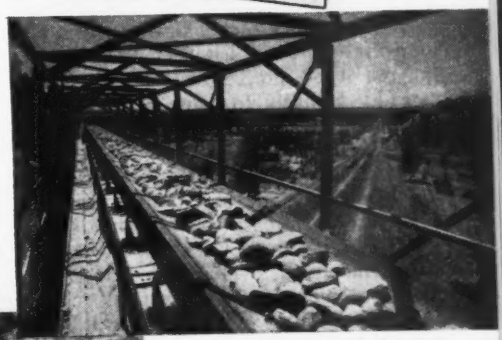
THE COLUMBIA CONSTRUCTION COMPANY REPORTS ON TIMKEN BEARINGS AT SHASTA DAM



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To this listing of gases to be found as a result of a mine fire should be added a large number of gases formed by incomplete combustion of coal and of methane, as also of the gases already generated by the more complete combustion of coal, which gases may be burned only incompletely as soon as the seals have been erected. Among the gases generated by incomplete combustion are aldehydes, ketones, organic acids and other hydroxylated hydrocarbon compounds, including alcohols. Combined nitrogen compounds also will be found.

These may all be in small percentages, though that by no means is certain. Many of them would be extremely dangerous because of their low lower limits of flame propagation rather than because of their poisonous characteristics, which are relatively mild. No one apparently has analyzed mine-fire gases to determine the presence of these compounds, but their existence is suggested by the smell of the fire, their presence in laboratory furnace gases and the fact that a wetted handkerchief placed over the face, it is declared, sometimes enables men to pass with safety through the gases from an explosion, despite the lack of solubility of carbon monoxide. Carbon dioxide, carbon monoxide, methane, hydrogen and water vapor are devoid of odor, but some of the hydroxylated hydrocarbon compounds are smelly. However, some of the higher paraffin gases, the result of distillation following more perfect combustion, also are odorous.

The Orsat apparatus is not suited for the detection of the hydroxylated hydrocarbons. In fact, they, in a degree, vitiate its findings. Natural gas, mostly methane and ethane, will burn without assistance in 65 percent of the air required for complete combustion and coke-oven gas in only 53 percent. But more favoring conditions for combustion, such as a high-temperature oven and the presence of catalysts, will lower those percentages to 20 and 11, respectively.

Q—After sealing is completed how long should return to the fire area be delayed?

A.—The length of time is not readily determined. In a very short time the fire should be of greatly reduced intensity and accordingly the temperature of the atmosphere within the seals should be greatly diminished. As a result a partial vacuum will be created in the sealed area, such as will bring a tremendous pressure to bear on the seals. Air is sure to leak through the stoppings in such a large measure that the fire will be revived, unless indeed some provision for feeding carbon dioxide or nitrogen to the fire has been provided. Even when seals are most carefully constructed they are not sufficiently leakproof. Extinctive gases must be added or be evolved. Methane in many cases is the gas which prevents inleakage of air.

Unfortunately, nitrogen or dry ice are rarely available unless they are ordered immediately when direct fire fighting starts. At no time is it more important to have inert gas to fill the vacuum, because never is the fire so hot as just before sealing and hence at no time is the vacuum as marked as after the fire is first sealed.

State Mine Inspectors, Illinois*

To Seal or Not to Seal

Q.—What conditions would lead you to decide in favor of sealing a mine fire?

A.—A mine fire should not be sealed until every resource has been tried to extinguish it by direct attack, because sealing (1) Is likely to cause an explosion soon after the seals are completed or again when they are being removed.

(2) Leaves in the mine a section that is full of methane, carbon dioxide, carbon monoxide or nitrogen, all of which gases are irrespirable; methane is explosive and carbon monoxide is poisonous, dangerous enemies to have in one's rear, especially carbon monoxide. These gases will leak and vitiate the mine air and may do more harm when, in unsealing, they are released.

(3) Deprives miners of employment.

(4) Subjects the company to much expense.

Why Are Fires Sealed

Q.—What do you expect to achieve by sealing a mine fire?

A.—Primarily, I would aim to prevent the access of air to the fire. When the fire ceases to receive such air, it will cease to burn. One defect of sealing is that the fire is a long time cooling because there is no access of cool air, water or sand to lower the temperature of the embers, as is provided always in direct attack. Another purpose is to prevent the gases which escape from the fire and the oxygen-free nitrogen from contaminating the mine air, but this result is obtained at the expense of locking them up in the mine with the methane. With direct fighting, these gases are drained away as fast as they are formed. A third purpose is to prevent the spread of the fire to the adjoining workings.

When to Remove Seals

Q.—How would you determine whether the fire is so completely extinguished that the return of fresh air will not revive it?

A.—(a) When the stoppings are being erected, pipes should be placed in them with valves permitting samples to be drawn from behind them.

(b) Samples should be taken at intervals and tested with Orsat apparatus to ascertain what gases are behind the seals, especially the percentage of oxygen and methane. It is not enough to test the gases with an approved or other safety lamp because, if there is a concentration of methane in excess of somewhat more than 15 percent, that methane will arrive at the flame in some such concentration and put it out, leading the observer to believe that the atmosphere behind the seals is not only irrespirable but incombustible, when the fact is that the atmosphere is highly methanous and will explode violently if mixed with a sufficient quantity of ordinary air, provided it is ignited by a spark or flame.

(c) I would ascertain whether the quantity of methane is increasing in such measure in relation to the quantity of inert gas that an explosion behind the seals will result. If, on opening a valve, air enters the sealed area, no satisfactory sample can be collected, because if the pressure outby is greater than the pressure inby the stopping, air is sure to be leaking through the stopping, and the sample taken accordingly will be more or less misleading.

Look for Signs of Fire

(d) Before opening the sealed area to the passage of air I would have oxygen apparatus men enter through an air lock and examine conditions in and around the former fire area. Absence of glowing coal, while reassuring, is not a sufficient criterion as to the possibility that reopening the area will cause a resumption of combustion.

(e) I would ascertain the temperatures of the coal around the fire area, if possible, and see whether they exceed the temperatures at which I might expect my particular coal to burn spontaneously, when it already has been "activated" by heat. This is the better guide as to the earliest moment for opening the area to the inflow of air. Water admitted by a pipe and played on the coal face where the fire has been hottest, the introduction of a small fan to spread the heat from the hot regions to those that are cooler and the use of dry ice to make the cooling doubly sure are ways of making certain the dangerous and costly sealing job will not have to be repeated.

Why Coal Should Be Cool

Offhand, one would expect that coal that has been heated would lose its ability to reheat, because it has become partly carbonized, but that does not seem to be the case. By heating it is rendered more capable of adsorbing oxygen. In the language of the industrial chemist, it is "activated." Those who carbonize coal at low temperatures find it difficult to prevent it from reigniting spontaneously. They never store the coal until after it has been turned over in the presence of cool air many, many times. To stock it uncooled would be an invitation to ignition. It tends to catch fire long after it looks quite insusceptible to renewed combustion. The larger material is still hot inside and accordingly likely to give trouble. So also, in the mine, the deeper parts of the pillar have heat that will be communicated to the shallower and start a new fire, unless some method of cooling is provided—ventilation with a cool inert atmosphere, dousing with water, applying a cooling agent or loading the hotter material into mine cars.

* Continued from December, 1944, *Coal Age*, p. 116.

IN 5 MAJOR MARKETS...

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Better mechanical preparation holds the answer to lower production costs, to higher quality and to *more sales!*

During 35 years of designing and building coal preparation equipment, Morrow tipples have been efficient, economical producers. Morrow engineers seek opportunities—*now*—to design and equip more efficient preparation plants for postwar operations.

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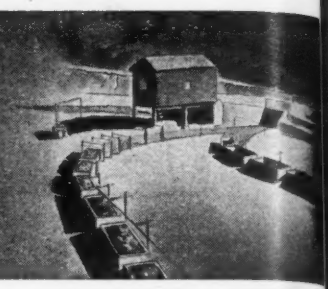
Designers + Builders of complete coal tipples + coal handling equipment for 35 years

TIMELY OPERATING IDEAS



Tire Casings Repaired in Place

A SPOT VULCANIZER for processing certain types of tire injuries not only prolongs tire carcass life but saves manhours usually required to dismount and remount tires, declares R. J. Owen, transportation department, Pacific Gas & Electric Co., San Francisco, Calif., in the August, 1944, issue of *Bus Transportation*.

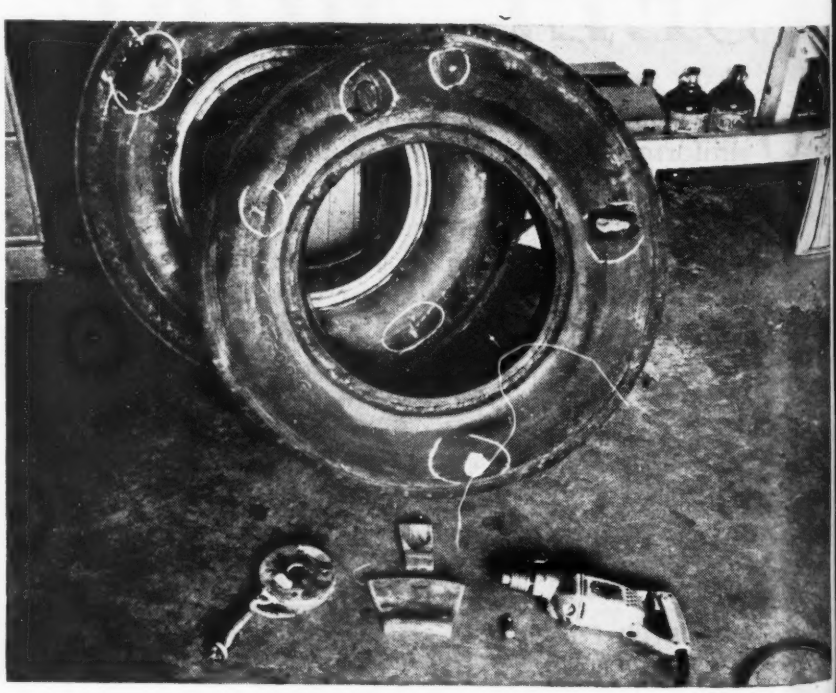
"The vulcanizer consists of an aluminum plate electrically heated with a 400-watt 115-volt ring heater. A thermostat controls heat at 280 deg. F. Two removable contact plates that conform to tire surface and a C clamp that holds the apparatus in place and applies pressure complete the vulcanizer. Other necessary equipment includes an electric drill and small rotary file, rubber cement and rubber stripping stock.

"Requiring very little training for proficiency, the repair process is simple and can be used at the place of vehicle storage by garage personnel. Cracks (including radial cracks), abrasions, holes and other injuries can be repaired in any location covering a reasonable area on tires of any size. However, the process is subject to the limitations of one ply broken or cut on four-ply tires, two plies broken or cut on six-ply tires, and four plies broken or cut on eight- and ten-ply tires.

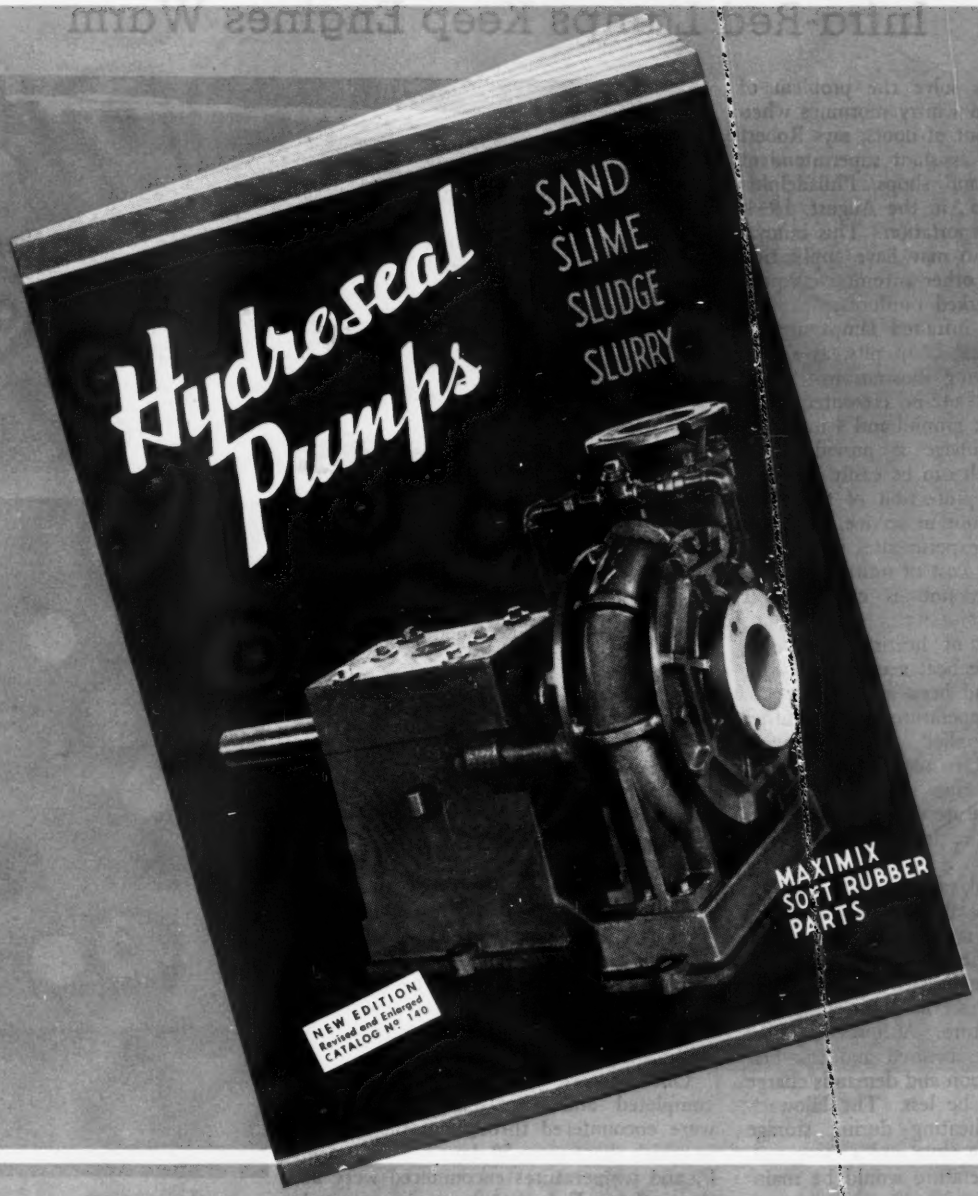
"In making the repair, tire pressure is set at 40 lb. All dirt and foreign matter in and around the injury are removed. Loose rubber and fabric are cut away with a knife, and hole sides are cut to about 45 deg. with tire surface. The entire hole surface is roughened with a rotary file attached to an electric drill and then is covered with rubber cement, which is allowed about five minutes' drying time, or until the cement is no longer fluid. Then the hole is filled with rubber stripping stock $\frac{1}{16}$ in. thick until level with the surface of the tire.

"After the vulcanizer is allowed 15 minutes to heat to operating temperature, it is placed over the stripping stock and pressure is applied with the clamp. A contact plate conforming with the shape of the tire is used on a sidewall, and the plate only is used on tread. Twelve minutes heating time is allowed for each $\frac{1}{16}$-in. depth of stripping stock used. When the vulcanizer is removed, the repair is complete. Tread design may be cut in repairs of large area."

Tread of the tire is being mended with the spot vulcanizer.



In the background are tires in various stages of repair and in the foreground are the major tools used in the repairing operation.



GUIDEBOOK for Planning Your Post-War Abrasives Pumping

Thousands of Hydroseal Pumps are now in service, operating under what seems to be every conceivable pumping condition. Our "Case History File" contains accurate records of power and maintenance costs of a large percentage of these installations, and since these records have been maintained over a period of years, they give a true picture of Hydroseal economies. . . . In addition to a complete description of Hydrosealing and Maximix Rubber Protection, our Catalog No. 140 contains complete tables for pumps having capacities from 10 G.P.M. to 7000 G.P.M. of abrasive solution, under various conditions. Send for this catalog and keep it handy for planning new pump installations or replacements of inefficient or inadequate conventional pumps. Should you want facts regarding Hydroseal Performance under special conditions, write us.

HYDROSEAL, PACKLESS AND MAXIMIX DESIGNS ARE COVERED BY PATENTS AND APPLICATIONS IN THE MAJOR MINING CENTERS OF THE WORLD AND CAN BE PURCHASED ONLY THROUGH THESE COMPANIES

The Allen-Sherman-Hoff Co., 231 S. 15th St., Philadelphia 2, Pa.

Infra-Red Lamps Keep Engines Warm

INFRA-RED LAMPS solve the problem of starting motors on wintry mornings when buses are stored out of doors, says Robert H. Dalgleish, Jr., assistant superintendent of rolling stock and shops, Philadelphia Transportation Co., in the August, 1944, issue of *Bus Transportation*. This innovation, it is felt, also may have application where trucks and other automotive equipment must be parked outdoors.

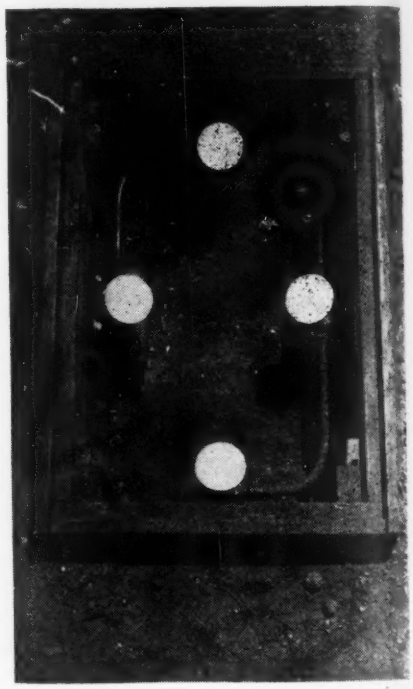
Four 250-watt infra-red lamps are installed in individual lamp pits, as shown in the accompanying illustrations. These pits consist of a 27x42-in. creosoted wood frame 16 in. in the ground and 4 in. above the ground. Drainage is provided and wood covers, which can be easily removed and replaced for protection of the lamp equipment when not in service, are used. Cost of the first experimental installation was $107 per bus; cost of units of a more permanent construction is estimated at $200 each.

"Two methods of heating were considered: one where heat was applied after the bus engine had been allowed to cool to the storage temperature and the other where heat was applied, after the engine had been operated, to retard the radiation of the normal engine heat. Tests were conducted to duplicate these conditions so as to determine the heating capacity required in each case. . . .

"It was decided, as a result of these tests, that economically it would be desirable to retard the radiation of the natural engine heat by the use of the infra-red heat during storage since the buses would enter storage from service with engines at operating temperature. A lower installed capacity would be required and the first cost of the installation and demands charge for current would be less. The kilowatt-hours used for heating during storage would be about the same and a more constant engine temperature would be maintained.

"The capacity selected was 1 kw. per bus, since in the climate around Philadelphia there are very few days in which the temperature goes below 0 F. and in the rare incidents of extreme weather special precautions could be taken to protect the engines. This would reduce the installed capacity to a minimum, thus reducing demand charges."

Parking berths with built-in infra-red heating pits in outdoor storage yard.



Right: Looking down on pit with screen removed to show lamp arrangement.

Excessive lamp breakage was experienced in the initial period of installation, since the Type R-40 drying lamp used was not satisfactory for outdoor operation without protection against cold fluids striking the hot lamp. "Hard glass lamps were tried and proved satisfactory. It is expected that in the future the Type R-40 lamp will be available in hard glass. Experience conducted with hard-glass shields over the Type R-40 lamp have proved satisfactory from a protection standpoint but reduce the efficiency approximately 6 percent."

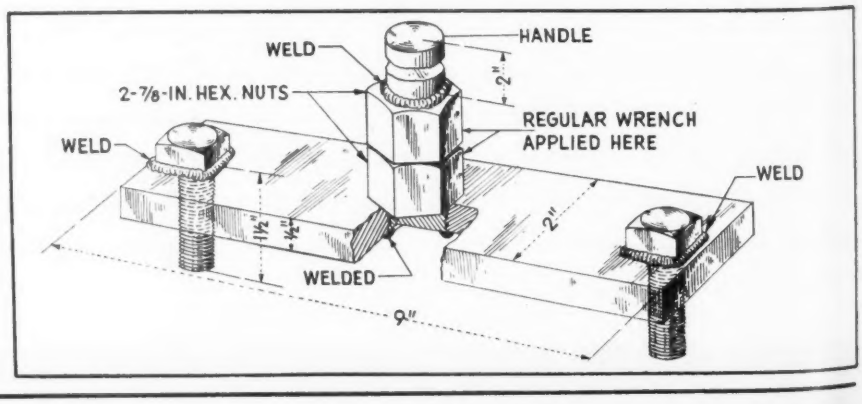
One infra-red heating season has been completed and "no starting difficulties were encountered throughout the winter, in which there were 50 days below 20 deg. F. and temperatures encountered were as low as 2 deg. F. In fact the engines started better and required less choking than those stored in garages where the temperature averaged 35 to 40 deg. since it was possible to get heat directly on the carburetor and intake manifold."

"It is apparent," says Mr. Dalgleish, "that the cost of infra-red heating is considerably lower than heating by idling the engines, considering the cost of the gasoline, labor for starting and stopping the engines and the wear on the vital engine parts due to the dilution of the lubricant caused by operation."

Special Wrench Eases Locomotive Work

A SHOP-MADE WRENCH, writes E. C. Hitchcock, night electrician, New River Mine No. 6, Summerlee, W. Va., permits removing and replacing housing nuts on traction motors while still mounted in a locomotive, in about one-half usual time.

The wrench, shown in the accompanying sketch, is particularly useful when the cable tree happens to interfere with the use of the standard wrench. Its main advantage, declares Mr. Hitchcock, lies in the fact that it can be used on the motors while they are still in the locomotive.



How locomotive wrench is constructed.

There's NO tie like a Steel Tie

When the coal is coming off the working face, you can't afford delays due to an inefficient haulage system.

Inferior trackwork slows up production; causes excessive maintenance. To insure substantial, firm, non-spreading track in both rooms and secondary haulageways, install Bethlehem No. 5 Steel Ties. They're made specifically for the 40-pound rail that is now so common in mechanical coal mines.

Rigid, sturdy No. 5's are built to withstand the crushing weight of mechanized cutting and loading machines. They're strong . . . hold their shape even under persistent pounding. Yet you can easily pick up a No. 5 and carry it in one hand, for it weighs only five pounds per foot of section.

It takes no experience to install these husky steel ties. See how the worker in the picture is knocking the clips into place with an axe. That's all there is to it. Simply slip the tie into position under the rails, making sure that the stationary clips are snug against the flanges; then tap the revolving clips—and the job is done. Those two big time-wasters—spiking and gaging—are completely eliminated.

Bethlehem No. 5's help increase production, save maintenance, cut installation costs to the bone. You can use them over and over again. Once you've tried them, you'll never again be satisfied with any other kind of ties.

Ask a Bethlehem man to furnish complete details.

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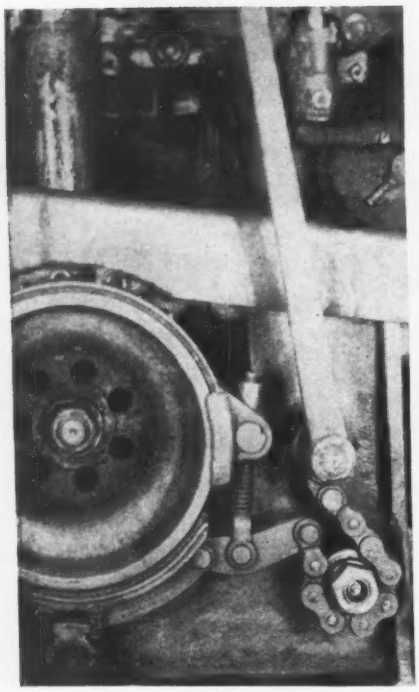
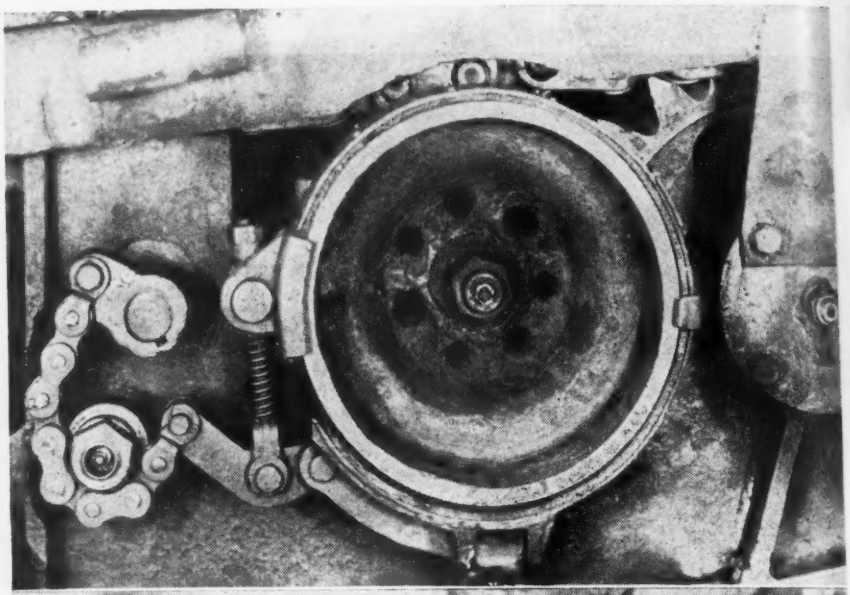
Loader Brake Rigging Modified for Efficiency





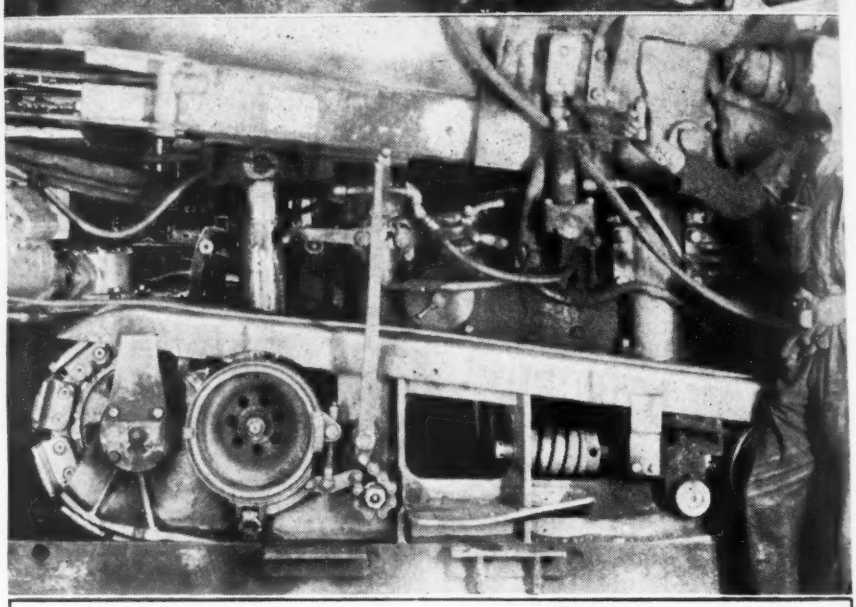
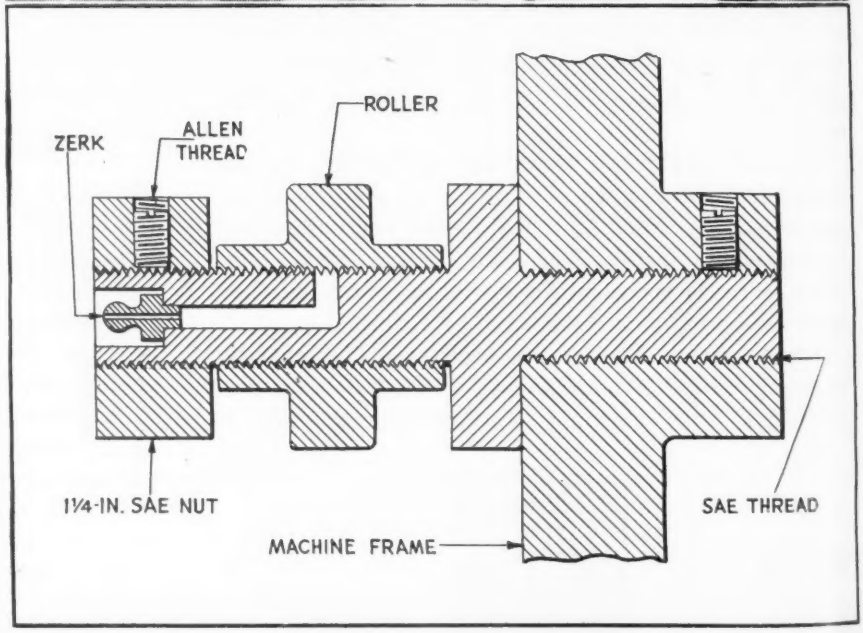


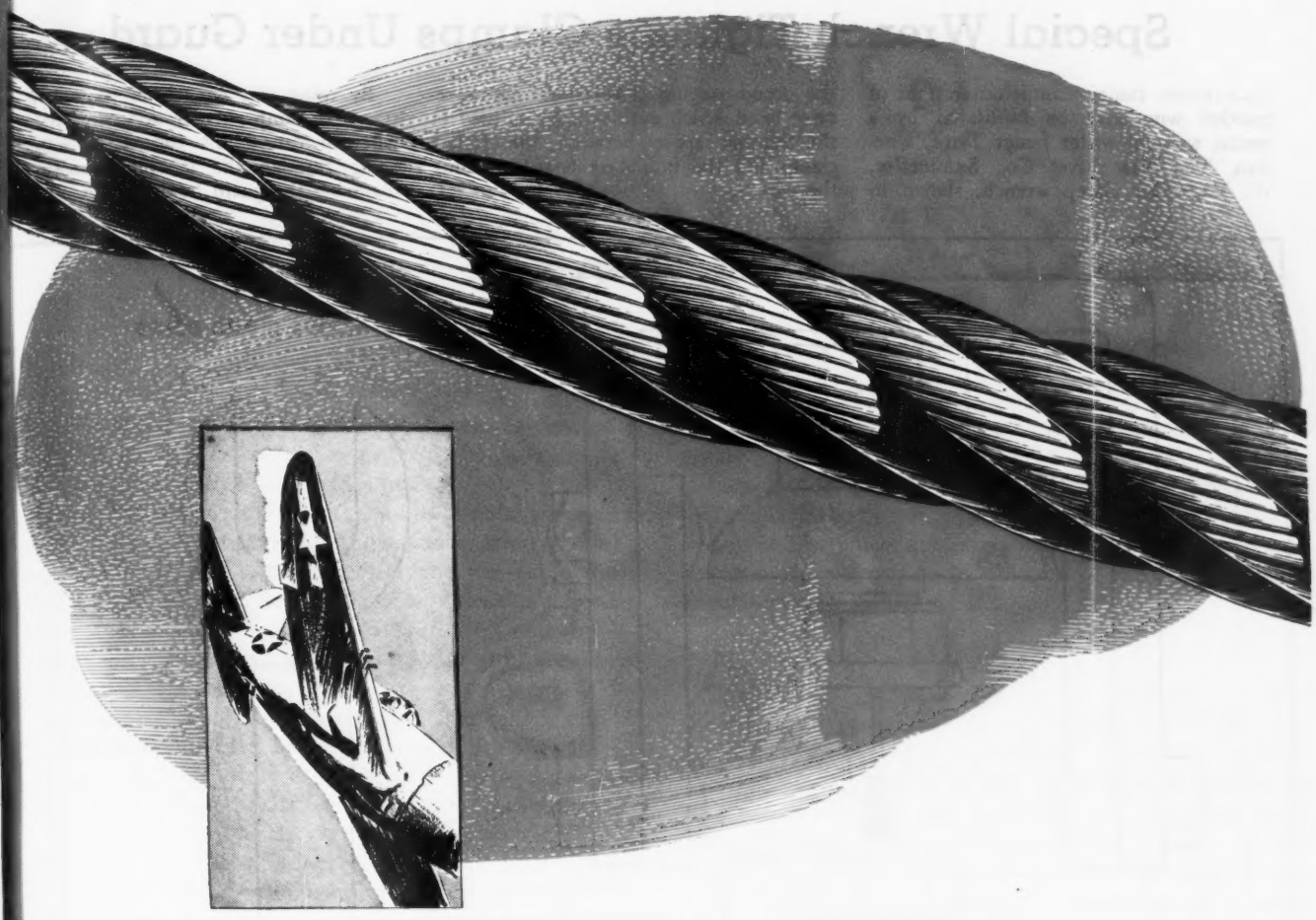
Fig. 1 (above)—Chain-brake connection to operate caterpillar differentials for steering Joy loading machine. This is the operator's side. Fig. 2 (above, right)—Side of loading machine opposite to that shown in Fig. 1. Fig. 3 (right)—Complete steering-brake assembly on the operator's side. Fig. 4 (bottom, right)—Cross-section of chain idler and support. Actual dimensions will depend on the chain used and the frame of the machine it is applied to.

A BRAKE MECHANISM for Joy caterpillar differentials worked out by the management and men of the Bell & Zoller Coal & Mining Co., Zeigler, Ill., is so constructed that when the brake is set on the operator's side of the loader it is free on the opposite side, and vice versa. In the original design, the steering lever actuated the brake through a toggle joint. While there was, and still is, adjustment for the wear of brake bands, no adjustment was provided for wear of the toggle links.

Fig. 1 shows the chain connection devised to replace the toggle links on the operator's side. Fig. 2 shows the arrangement on the opposite side. It will be noted that the original brake-band adjustment is retained. The chain links had to be bent to fit the bellcrank and lever at the two connections. The position of the bellcranks on the ends of the cross shaft had to be changed somewhat.

Fig. 3 shows a larger area of the operator's side of the loading machine with a view of the complete assembly of the braking assembly on that side. Fig. 4 is a cross-section of the chain idler and its support. This device makes operation positive and almost effortless. Ernest Prudent is superintendent at Zeigler No. 1, and Andrew McMurtrie is chief electrician.





To shake an ME-109 off his tail, a fighter pilot tries for the tightest turn, uses all the aileron he has. His aileron controls are one-eighth inch steel cable . . . To hold fast the biggest battlewagon to its mooring or anchor calls for two and one-half inch cable . . . Rochester makes both sizes for both purposes . . . and almost every other size for almost every need of the Army, Navy, Air Forces and Merchant Marine.

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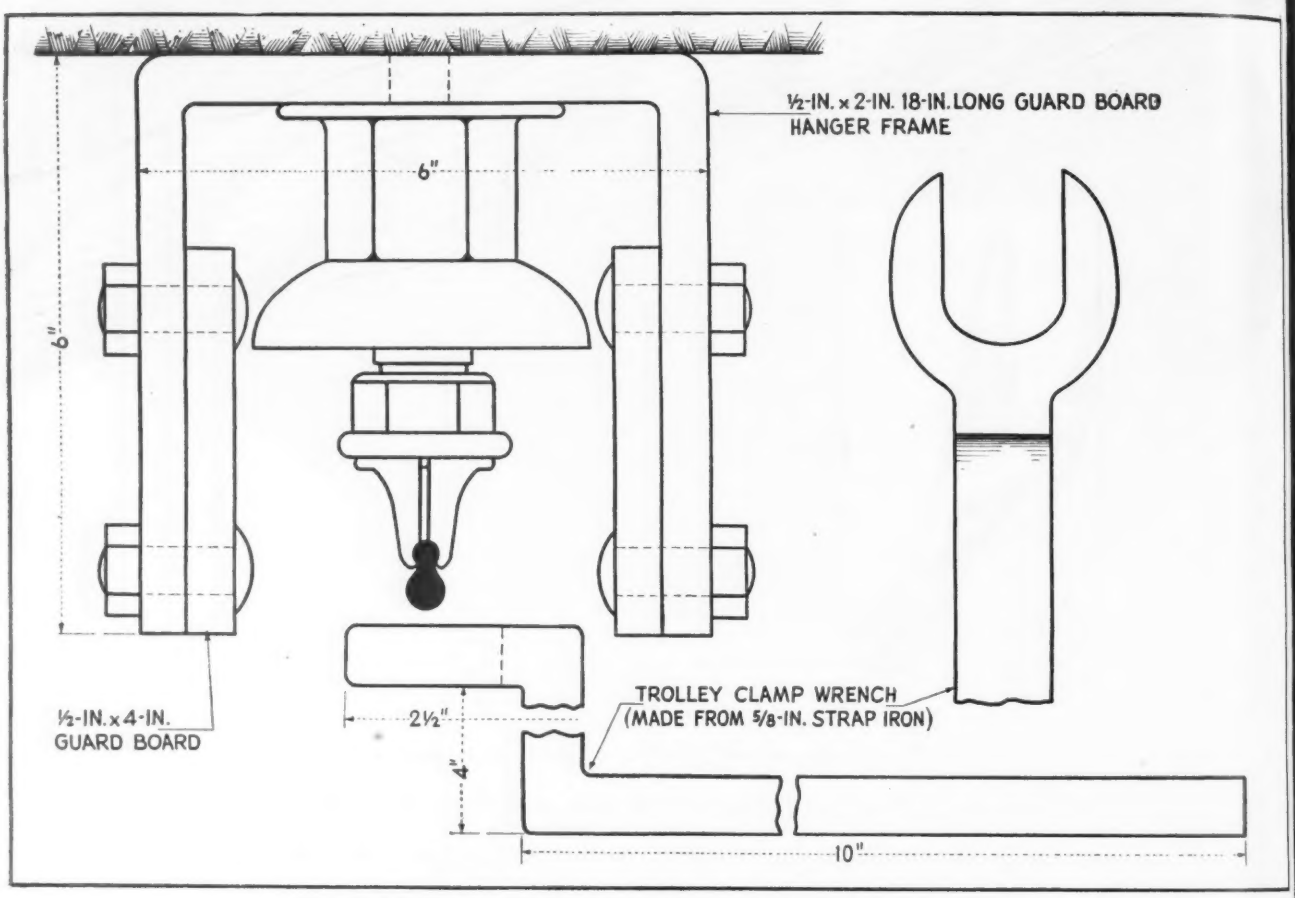
Special Wrench Tightens Clamps Under Guards

TIGHTENING trolley clamps on sections of guarded wire may be facilitated by a special wrench, writes James Tyree, wireman, The New River Co., Summerlee, W. Va. This clamp wrench, shown in the accompanying illustration, has a reverse bend which enables it to be used in the limited space between the trolley clamp and the insulating board guarding the wire.

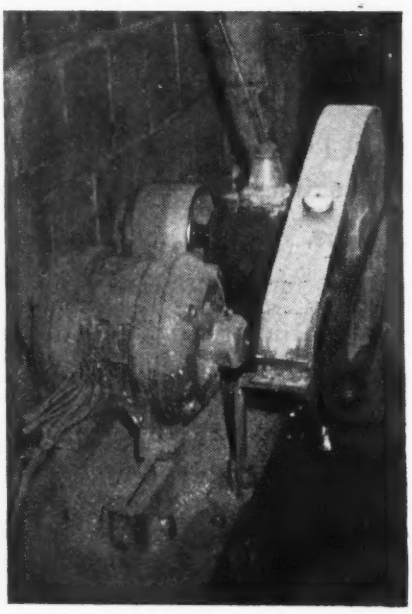
By using this wrench in place of the standard clamp wrench, says Mr. Tyree, a wireman can adjust the clamp without going through the laborious process of removing the guard board.



Wrench designed to tighten trolley clamp without removing guard board.

Stoker Drive Adjustment Made Easy

THE CHANGE from steam to motor drive for the boiler stoker feed at the power plant of the Consolidated Coal Co., Herrin, Ill., posed the problem of adjusting the speed of a drive powered by a constant-speed squirrel-cage motor. This was done by interposing a discarded automobile gear shift between the motor and driven shaft. The range of speed ratios is sufficient to make a thoroughly satisfactory drive.



The drive from motor to gear shift is a chain; that from gear shift to stoker driving shaft is a belt.

Give and Take!

This section on timely operating ideas is where operating men are paid a little something to give of their experience — that all who read may feel free to take and put to use. This makes for progress—and that's why Coal Age is interested in hearing about any new electrical, mechanical, operating or safety idea that you have at work—together with a sketch or photograph if it will make the idea clearer. For each acceptable idea it will pay $5 or more on publication.

WHAT DOES AMERICA WANT?

IT IS THE PURPOSE of this editorial, the thirty-first of a series, to state the urgent need for a clear declaration of American policy in world affairs.

Within the past few weeks there has been a wakening conviction in this country that the determination of international arrangements cannot safely be put aside until victory has been won. For we have seen actions taken in Europe seemingly without full consultation and agreement of the Allied powers, which may profoundly affect the design of the post-war world.

A declaration of American policy is needed, and it should be accompanied by a statement of our firm intention to exert full effort to procure its acceptance and furtherance. Emphatically, this does not mean that an American platform should be put forth as an ultimatum, which other nations must accept totally, or reject at the cost of having the United States withdraw from collaborative participation in world agreements and organization. On the contrary, the first plank in such an American platform should be a firm commitment on our part to participate with our associate nations in building a general system of world security and order. By definition, this requires that each participant be willing to accommodate its purely national interests to a program that can be accepted as fairly representing the interests of all. But equally, there is imposed on each participant an obligation to state honestly and openly what it conceives its individual interest to be, as well as its concept of what measures will best serve the general interest.

☆ ☆ ☆

Americans have displayed a singular diffidence in the matter of formulating a bill of American objectives—singular, in that it contrasts so sharply with our power to exercise as broad a leadership as we are able to define. This reluctance stems partly from the inherent difficulty of arriving at a coherent statement of national aims in a country like the United States—so vast in area, so multiple in its sectional and group interests, and so soundly committed to the free expression of individual thought. But it stems also, in part, from a tradition of national isolation which, however understandable in historic perspective, now stands clearly discredited by two world wars which were not of our making, but from which we were unable to hold aloof.

That the economic wellbeing and political security of the rest of the world is closely bound to the decision and performance of the United States is questioned nowhere but in America. Political boundaries and restrictions cannot build effective fences against the interplay of economic forces, and the sheer weight of American economic influence is of crucial import to all the other nations of this globe. In large measure their decisions will be shaped either in response to the opportunities that our procedures offer them, or in defense of interests that our procedures may jeopardize.

☆ ☆ ☆

The United States contains only about 6 percent of the world's population. But—our national income, before the war, amounted to almost 25 percent of world income; our industrial output as a whole approximates 45 percent of world totals, and we now are producing a like percentage of the world's munitions; we have 35 percent of the world's railroad mileage; 25 percent of merchant fleet tonnage; 50 percent of the world's telephones; 45 percent of steel production; 40 percent of aluminum production; 33 percent of coal output; we are refining (though part of the production comes from imports) 55 percent of the world's copper, and 70 percent of its petroleum; we now are producing 50 percent of the world's rubber (though post-war resumption of natural rubber production will sharply reduce this balance); our shares of agricultural production are, of course, much smaller, but just before the war we accounted for 35 percent of world cotton production, 15 percent of wheat, and 10 percent of wool.

Whether we like it or not, we must exercise political responsibilities commensurate with the weight of our economic power in an inter-dependent world. But before responsibilities can be assumed, they must be defined. Can the United States arrive at a clear agreement and statement of aims for which it is willing to stand sponsor?

The recent campaigns of both political parties have helped to provide an encouraging answer. In general, election mandates are glaringly deficient as indicators of a unified national purpose. A majority of voters declare themselves for the winning candidate. But even among the majority there are varying degrees of enthusiasm for the platform principles espoused by their candidate; and the substantial minorities of the defeated parties may have had no enthusiasm whatsoever for particular planks in the winning platform, or for the platform in its entirety. A sportsmanlike deference to the will of the majority is a feeble substitute for unified national conviction.

But this Presidential campaign was noteworthy for certain basic principles upon which both the platforms and the candidates of the major political parties were

united. Surely, upon such areas of agreement there may be said to have been an American mandate; the more so, because upon certain of them, we have evidence that no party or candidate could have declared opposition with any hope of victory. What then were these agreed-upon principles? The following is an attempt at a fair summary:

1. That America, in collaboration with its Allies, is committed to seeing the war through to the unconditional surrender of our declared enemies.

2. That America is committed to a responsible role in a world security system after the war, including a commitment to lend the support of our armed forces to repel aggressions that may violate such security.

3. That America is committed to the post-war goal of substantially maintaining in this country an economy that will provide jobs for those who are able and willing to work.

4. That America is committed to the principle of achieving this goal of sustained, high-level employment of manpower and economic resources under a system primarily activated by competitive enterprise.

These are American mandates. They can be made the nucleus of a coherent national policy, for they define aims upon which the great majority of our people are emphatically agreed. But no one can pretend that in this generalized form they serve as more than directional guides for either internal legislation or international negotiation. This skeleton of aims must be clothed with the living flesh of agreed-upon means. Here we have no national mandates of comparable clarity, but it is patently clear that it is our compelling task to achieve them.

☆ ☆ ☆

On our elected representatives in government rests the primary responsibility for formulating the specific programs required to implement national policies. Under our system of government, those representatives need continuous nourishment in the form of mandates as to what the people want. Particularly during a period when so many urgent problems are being thrashed out upon an international basis, this imposes a grave responsibility upon all sectors of our citizens; for it requires them to think in terms of the welfare of our nation as a whole, to focus upon those points which offer possibilities for substantial agreement among Americans, rather than upon matters of individual, group, or sectional advantage.

In earlier editorials I have tried to define a basis for national policy in keeping with that broad purpose. They have dealt with problems that are basic to the healthy functioning of free enterprise under the competitive system, with the mobilization of our resources for war and for reconversion to peace-time production, with labor and management responsibilities and relations, with national debt and taxation, with foreign trade and our economic relationships abroad, with the industrial development of backward areas. Since they have been presented in the McGraw-Hill publications, which reach a group broadly representative of all American industry, they have centered upon problems that have an economic rather than a strictly political import.

Future editorials, to appear during 1945, will deal with comparable subjects selected in recognition of the urgent importance for arriving at concerted definitions of national policy. I am fully aware that no individual or group can speak authoritatively for the American Nation. But I hope that an honest attempt to formulate sound concepts of national interest in crucial economic matters will help to crystallize American policy both by focusing agreement and by eliciting dissent.

☆ ☆ ☆

Here there is space only to indicate in broadest outline what I conceive to be desirable foundations for an economic policy for the United States:

1. The attainment of a high and sustained level of business activity and employment in the United States and in the world.

2. Active and expanding markets for world trade based upon fair competition rather than upon bloc agreements, discriminatory preferences, and cartel arrangements.

3. The encouragement of industrial development in nations that have been backward in that respect.

4. A recognition that hospitality to imports, rather than constituting a threat to national standards of living, offers in fact the most potent instrument for international bargaining that any nation can command.

5. A willingness to assume a responsible national role in international arrangements designed to provide such financial stability as may be needed to support mutually advantageous world exchange of goods and services.

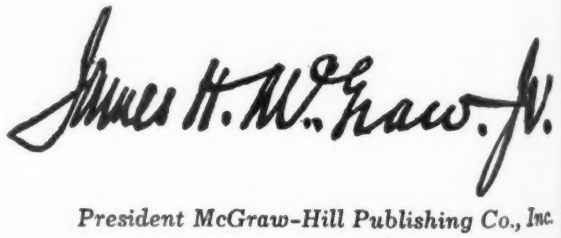
We must see to it that the end of military warfare does not merely open the door to an era of economic warfare.

The fact is that America has no choice but to assume leadership in world affairs. For the weight of our influence will be felt by other nations no less whether our attitude be positive or negative. And the cost to us of any international obligation which we might undertake must in all fairness be weighed against the equally real cost to us of dealing with measures that others may take to protect themselves against the results of our nonparticipation.

We have tended in the past to approach international commitments timidly, fearful that we might be outwitted in a world battle of wits. And in so doing, we have too often ceded to others the initiative of suggestion, leaving to ourselves the thankless task of accepting or rejecting what they demand of us.

Our one bargaining weakness stems from the fact that other nations, by contrast feeble in potential power, know what they want and are able to mobilize all their strength to achieve it.

America can be the most effective nation on earth—if only it knows what it wants.



President McGraw-Hill Publishing Co., Inc.

THIS IS THE 31st OF A SERIES

Do you have trouble starting up your tipples in cold weather?

For effective help on this problem call in a Gulf Service Engineer

IF YOU HAVE TROUBLE starting up your tipples in cold weather, take a tip from scores of mines that have solved this problem with the help of Gulf Lubrication Service Engineers. For the answer is often a change in the type of lubricant or method of application.

Gulf Service Engineers have a background of thorough training and broad practical experience with all types of coal mine equipment. They know how to help you avoid operating delays of this kind through the proper application of the right lubricants.

The scientific lubrication prescribed by Gulf Service Engineers pays dividends in every phase of mine operation. It contributes to lower maintenance and power costs, fewer delays caused by mechanical troubles, greater tonnage, and improved safety.

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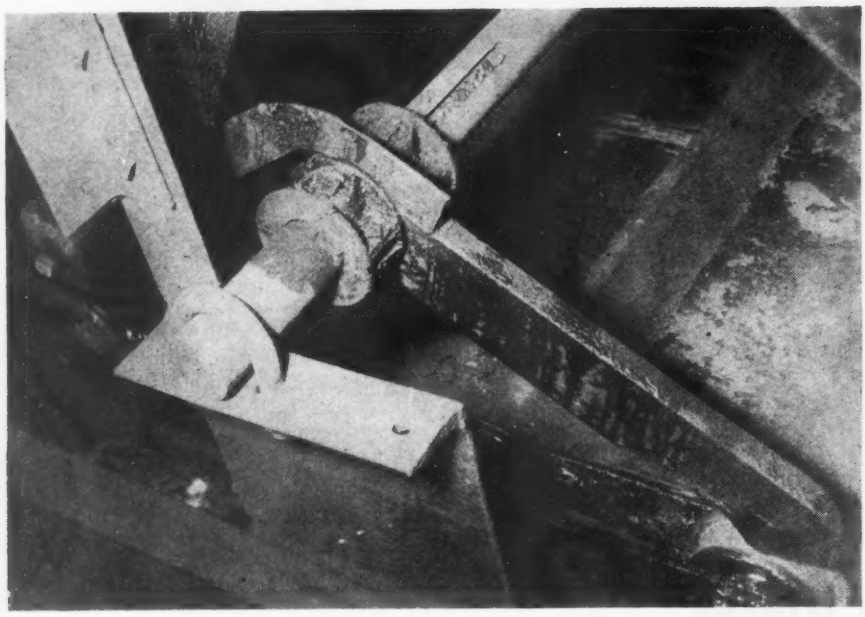
Dogs and Angles on Strands Protect Apron Conveyor



Pedestal, shaft and dog are of heavy construction. To reduce the blow as the dog drops back of each roller a bent and adjustable counterweight are added.

RETARDING CONVEYORS of the rope-and-button, scraper and apron types often cause or suffer considerable damage if the rope, chains or links break and allow the strands to pile up in the bottom structure or gallery. Auxiliaries can be attached to the latter two types, however, to prevent the back run and piling up in case of breakage. The accompanying illustration shows a non-reversing dog installed for this purpose on the lower strand of an apron conveyor at the new plant of the Guyan Eagle Coal Co., Amherstdale, W. Va.

This apron conveyor is 4 ft. wide and 300 ft. long on a pitch of 22 deg. A pair of dogs, one on each chain, is installed every 50 ft. Each dog of a pair pivots freely on a stationary cross shaft. Each dog also is partially counterweighted so it will drop lightly onto the succeeding roller.

So that the upper run of the apron conveyor cannot buckle and pile up, 4-in. angles are mounted securely above each chain and this guarding is carried on around the sprockets at the bottom.

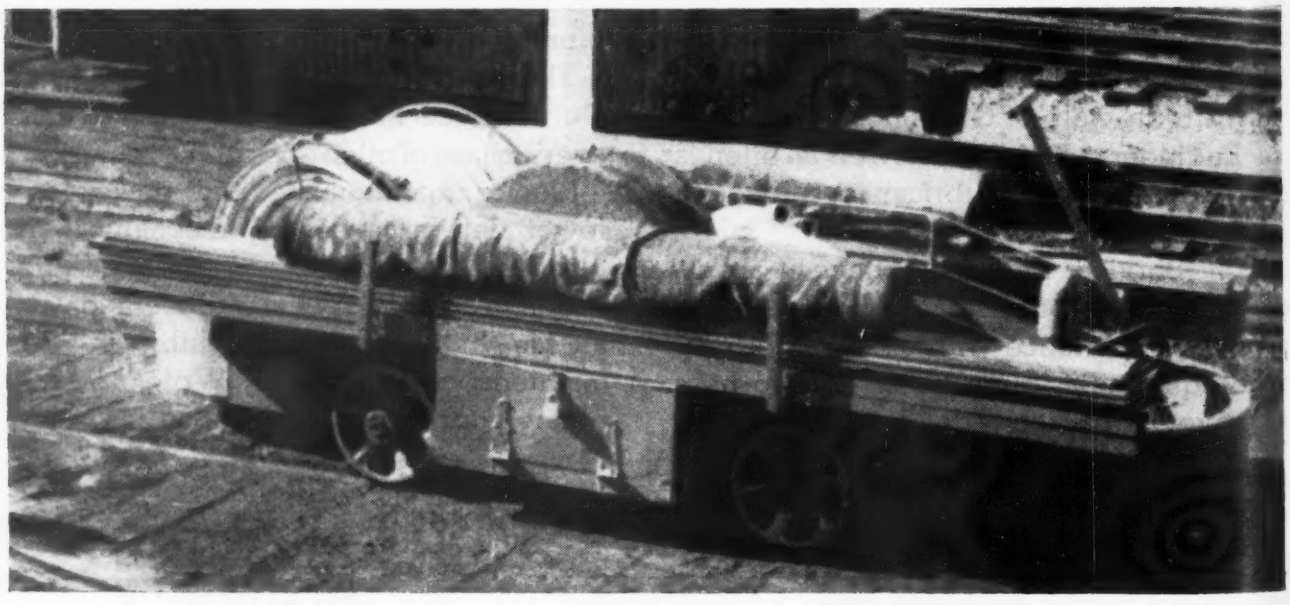
Dun Glen's Fire Equipment Always Ready

PORTABLE FIRE FIGHTING equipment which includes both electrically driven and hand-operated pumps is kept ready for use underground at Dun Glen No. 11 mine, Hanna Coal Co., St. Clairsville, Ohio, writes John Sowers, mine foreman. This compact fire truck, designed by Mr. Sowers and built by H. G. McCartney, mechanic, and shown in the accompanying illustration, can be hauled by a locomotive or, if need be, pulled by two men.

This fire department is equipped as follows: 500 ft. of 1½-in. hose—three nozzles; boards and 2x4's to build one brattice; two rolls of brattice cloth; one high-pressure hand pump; one 125-gal. centrifugal pump—100 ft. Duplex cable; two hatchets; two axes; two sledge hammers; two 18-in. pipe wrenches; an assortment of pipe fittings, including adapters for hose; two hand saws; two hammers and an assortment of nails; two all-service masks; first-aid supplies; 1,200 ft. of telephone line and one telephone; two sacks of wood fiber; and two Carboloy and one Pyrene fire extinguisher.

"The tools, pipe fittings, all-service masks and first-aid supplies are locked in metal boxes built on each side of the fire truck," Mr. Sowers stated. "One key opens all locks and the key is inclosed in a box attached to the truck. The glass in the door of this box must be broken to obtain the key.

"The truck will be available at all times and it will be inspected at frequent intervals and a permanent record made of each inspection to assure its being in the pink of condition at all times."



Fire-fighting equipment checked and ready for use.

Electric Power FROM A CONVEYOR BELT!

UNUSUAL? VERY—BECAUSE MOST CONVEYOR BELTS CONSUME POWER

At the Jewell Ridge Coal Company's mine at Tazewell, Va., coal is delivered to a conveyor belt which descends 215 feet, at a 15-degree slope, through a distance of 826 feet to the tipple below.

A regenerative motor starts the belt, but with full load and speed the motor automatically functions as a dynamo, generating a constant 30-kilowatt flow of electric power, and providing perfect speed control drag.

This was not only an unusual but a brilliantly successful integration of mine topography and sound engineering.

The belt is of Bull Dog quality, 48" wide, total overall length 1843 feet, and was vulcanized endless on the job by BWH engineers.

It is now over 7 years old and has stretched less than 3 feet though 10 times that amount was provided for. It looks as good as new and its eventual retirement is not foreseeable. Surely, this was straightforward belt building.

Whenever belts must possess the unusual in stamina, dependability and character, be sure to consult our nearest distributor and field technician, or write us direct.

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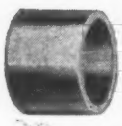
Works: Cambridge, Mass., U.S.A. P.O. Box 1071, Boston, Mass., U.S.A.

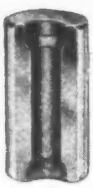
BOSS . . . the men swear by Cincinnati Chains and Bits . . . they're trouble-free!

GEORGE . . . they're being used everywhere . . . sorry we didn't start using them sooner . . . they save man hours and cut operating costs, too!



Long life, replaceable, hardened alloy steel Connector Insert gives new factory joint accuracy to a worn connector.

Easily removed heat treated Rivet holds Bearing Pin against longitudinal displacement.



Hardened Eccentric Pin is designed so it can't turn in block . . . puts joint wear between pin and insert.

CINCINNATI DUPLEX CHAIN

DUPLEX BIT

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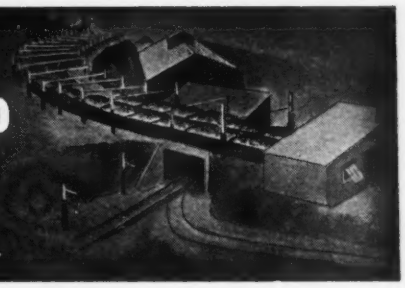
IT'S the same story in mine after mine . . . once they've tried Cincinnati Time Tested Duplex Chains and double ended reversible Bits. Boss and machine runners agree on the merits of Cincinnati Coal Cutting Equipment. The experience is always the same . . . satisfied operators . . . less power consumption . . . greater tonnage . . . less maintenance . . . and a saving in valuable man hours. Cincinnati Chains are tough because they're made that way . . . heat treated and drop forged . . . made of high grade alloy steel . . . and engineered to take wear and stress of tough production schedules.

COAL AGE NEWS ROUND-UP



Rail Rate Increase Again Postponed

Continuation for another year, to Jan. 1, 1946, has been ordered by the Interstate Commerce Commission of the 4.7 percent railroad freight rate increase originally granted March 18, 1942, and later suspended to Jan. 1, 1945. The Commission declared that any party to the proceedings in Ex Parte 148 may petition for reconsideration if circumstances and conditions affecting traffic and revenues substantially change.

•

St. Lawrence Project Down Till Next Session

Climaxing more than a week of debate, the U. S. Senate on Dec. 12 decisively rejected an amendment offered by Senator Aiken (R., Vt.) seeking to add the St. Lawrence project to the pending Rivers and Harbors bill. Just before the vote was taken, Senator Aiken produced a telegram from President Roosevelt which read: "Of course I want action as soon as possible on the St. Lawrence seaway. It is logical and inevitable. The quicker the better."

Revival of the issue was indicated, however, when Senator Mead (D., N. Y.) stated that hearings on the project would be held in the 79th Congress.

•

Knoizen Leaves WPB To Return to Joy

After more than two years of service as director of the Mining Division of the War Production Board, Arthur S. Knoizen has returned to his duties with the Joy Mfg. Co., Franklin, Pa., of which he is vice president in charge of sales and engineering. Mr. Knoizen, bringing with him 24 years of experience in the mechanization and operation of mines, began his work with WPB Dec. 1, 1942, as head of the Mining Equipment Division, which succeeded the Mining Branch organized by Dr. Wilbur A. Nelson, who went on to WPB staff duties. It is expected that Mr. Knoizen will be succeeded by Dr. Marcellus H. Stowe, deputy director.

Taking over when the late but not lamented PRP plan had about run its course and when CMP was looming up over the horizon, Mr. Knoizen skillfully guided his division through the uncertainties and complications of that period and, by his thorough understanding of mining and the mining-equipment field, his organizational ability and his untiring efforts, kept the necessary equipment and supplies flowing to the mines.

Organization, in fact, is credited by Mr. Knoizen with the results that were achieved. He explains it thus: "Everyone on the staff is an expert in his line and the mining industry owes them a debt of gratitude. They carried a tremendous load of detail. Without this organization it would have been impossible to perform our task of serving the entire mining industry." The effectiveness of that organization is measured by the fact that it had the full cooperation of the various end-use divisions of WPB and by general satisfaction with the service it rendered expressed on numerous occasions by the mining industry.

Mr. Knoizen's tour with WPB also included chairmanship of a mission of U. S. coal men and economists to Great Britain under the aegis of the Combined Production and Resources Board and the Combined Raw Materials Board. The objective of the mission was to assist Great Britain in the use of its own resources and substantial help in the form of U. S. mining equipment and technical advice to turn the production tide in the Isles and insure efficient distribution of the output. The mission's work has been reflected in significant changes and improvements in the British production picture.

A. S. Knoizen

New Rules Cover Explosive Use

New regulations which permit under certain conditions the use of not over 3 lb. of permissible explosive in shot holes have been drafted by the U. S. Bureau of Mines and made public by Dr. R. R. Sayers, director, in a letter to W. Garfield Thomas, chairman of the committee on increasing limit charge of explosives of the Coal Mining Institute of America. Dr. Sayers wrote:

"This Bureau has prepared a draft of a schedule that the use of 1½ lb. but not exceeding 3 lb. of certain permissible explosives be approved tentatively pending further investigation. The approval, which may be withdrawn at any time, expires June 30, 1946, unless renewed, and provides that in addition to the normal requirements governing the use of permissible explosives, the following requirements are observed:

"(1) Shotholes must be 6 feet or greater in length.

"(2) Explosives must be charged in a continuous train with no cartridges deliberately deformed or crushed, with all cartridges in contact with each other, and with the end cartridges touching the rear of the hole and the stemming respectively.

"(3) Examinations for gas must be made in the blasting area before and after firing a shot.

"(4) The permissible explosive must be one showing toxic gas omission that will place it in either Class A or Class B."

•

French Govt. to Buy U. S. Mine Apparatus

As part of its coal supply and rehabilitation program, the French Government is planning to purchase several million dollars worth of coal mining equipment from the United States during the next two or three years, according to Lt. Louis Dupret, chief of the mining section of the French Supply Mission. Emphasizing that he was expressing his own views as an individual and not as a representative of the French Government, he said that while surface machinery had been kept up well, the underground equipment is in poor shape.

Mining equipment needed from the United States, he said, is chiefly for drilling and for repair, maintenance and modern-

ization of underground transportation. While current French coal production, he continued, is about one-half of normal, it is hoped to reach the prewar level of 47,000,000 tons annually within three or four months, adding that the quick rehabilitation of the French mines had eliminated the necessity of importing 2,300,000 tons of coal in the last quarter of 1944.

Kentucky Studies Mining Problems

Self-Propelled Conveyors, Prefabricated Track, Safety, Valuation, Mine Scales and Management and Training Feature Kentucky Institute Program

SELF-PROPELLING rubber-tired belt conveyor drives used in mining a 42-in. banded seam of coal to the tune of 20 tons per face-man and favorable experiences in another Kentucky mine with prefabricated track materials for a mobile loader operation were reported in the mining-methods papers presented at the annual meeting of the Kentucky Mining Institute held at Lexington Dec. 8 and 9. Of the six other papers, two dealt with safety, one with valuation, one with mine scales and weight shortages, and two with management and training. A committee appointed a year ago to compile a "Coal Mine Reference Book" for the State of Kentucky delivered the goods by exhibiting a copy of the completed book just received from the binders. Danger of fire with synthetic trailing cables as compared to natural rubber was discussed.

C. Prewitt Gum, general manager, Wisconsin Coal Corp., Wiscoal, Ky., was elected president, and A. D. Sisk, safety director, Big Sandy-Elkhorn Coal Operators' Association, was again chosen secretary-treasurer. Paul M. Jones, retiring president, was in the chair two sessions and V. D. Picklesimer, superintendent, South-East Coal Co., Seco, presided at the third. At the opening of the meeting, C. A. Sine, safety engineer, Stonega Coke & Coal Co., Big Stone Gap, Va., gave a history of the original Kentucky Mining Institute, which passed out of the picture in the early twenties. W. H. Forbes, National Safety Council, Chicago, told of efforts being made to serve the coal industry better and asked cooperation of the mining men in submitting ideas for posters.

O. W. Evans, general manager, Norfolk & Western Ry. Fuel Department, was toastmaster at the annual banquet and the principal speaker was S. S. Willis, Governor of the State. The meetings drew a large attendance and it was announced t the first session that the institute membership had increased to 243. More names were added before the meeting was over.

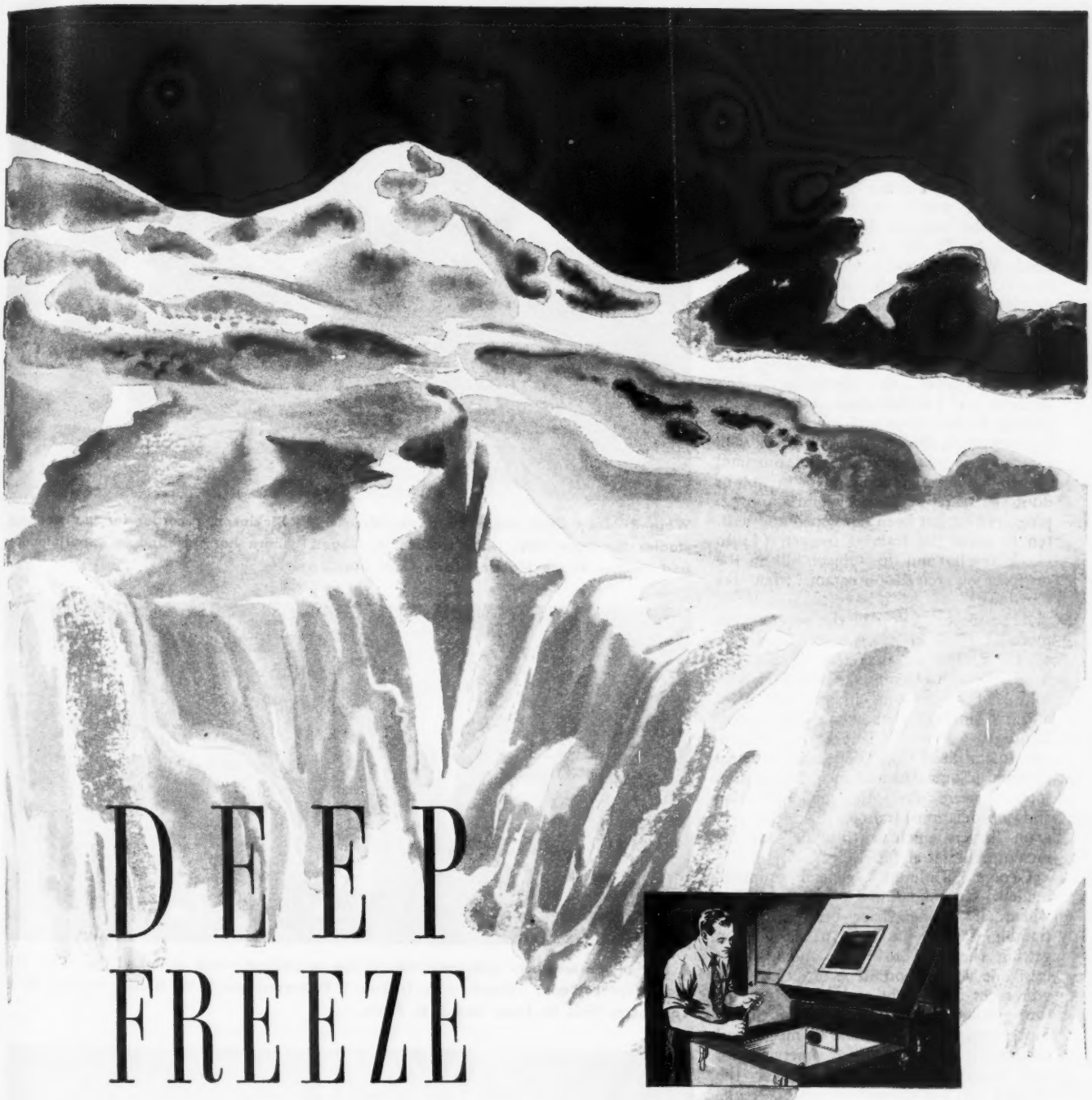
A. D. Sisk, chairman, Reference Book Committee, said that 5,000 copies of the book are being printed and orders are now being taken for their distribution at $1.50 per copy. Other members of the committee are G. M. Patterson, W. H. Tomlinson, J. F. Bryson, J. B. Allen, W. E. Wheeler, T. O. Long, E. J. Marron, R. J. Bailey and L. W. Huber.

M. K. Reed, operating engineer, Turner Elkhorn Mining Co., Drift, Ky., used moving pictures to illustrate his paper on portable conveyor work in No. 3 mine of the Sizemore Mining Co. His paper is abstracted on p. 92 of this issue.

C. Prewitt Gum (standing), general manager, Wisconsin Coal Corp., Wiscoal, who was elected president of the institute for 1945. With him are Henry A. Spaulding, mining engineer, Hazard, and G. Moss Patterson, chief, Department of Mines and Minerals, speakers at the final session.

At the close of the first session. Standing: C. A. Sine, W. H. Forbes and A. D. Sisk. Seated: M. K. Reed, Paul M. Jones and F. W. Gusweiler.

Three of the Saturday morning speakers: J. J. Foster, A. U. Miller and Lindsay Cobb.



DEEP FREEZE

The Cruelest Arctic Winter couldn't duplicate the cold to which we subject "U.S." Royal Mining Machine and Locomotive Cables in the test we call "Deep Freeze". We push the thermometer down to −70° Fahrenheit...cold rarely experienced by mankind—and Royal Cords and Cables take it.

Yet the "Deep Freeze" test is only one of six such rugged tests. "U.S." Royal Cords and Cables are also tried by heat, impact, compression, stretch and bend ...so that when they go from us to you we *know* they're dependable in every way.

That is why mine operators and locomotive designers can specify "U.S." Royal Mining Machine and Locomotive Cables with *absolute* confidence whenever they want balanced construction, flexibility, high dielectric strength, smoothness of finish, and long trouble-free service.

THE NEW "U.S." ROYAL *Safety Tested*

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Lindsay Cobb, assistant general superintendent, Norton Coal Corp., Nortonville, Ky., employed large drawings of a mine section and track layouts to show use of prefabricated track in three-room key-system haulage for track-mounted loading machines in the No. 11 seam. His paper also is abstracted in this issue (p. 89).

Training within industry, which has been under way for four years, was explained by F. W. Gunzweiler, program head, War Manpower Commission, Cincinnati. In his chalk talk he began by developing the theme, "Do We Expect Too Much of Our Supervisors?" He clearly indicated the urgent need for instituting the training of supervisors, outlined the tools available—job instruction, job methods and job relations—and closed by putting to executives and officials of mining companies the questions "Are you willing: (1) to sponsor a training program; (2) to appoint a coordinator for the job or do it yourself; (3) to review and approve a program that has been developed and written to cover the training project; (4) to check results and to subject all of the organization to the program, from the top down?"

"The more we hear of the program the more we think of it," was the conclusion of H. S. Homan, secretary of the Big Sandy-Elkhorn Operators' Association, who told of the operators' indorsement of it and its start in that section of eastern Kentucky. John T. Parker, superintendent, Inland Steel Co., Wheelwright, where all officials down to and including section foremen were given the job instruction and job relations training, said the program "is very much worth while" and the men are "better at their jobs."

George Tarleton, general superintendent, Consolidation Coal Co., Jenkins, where all foremen have been given the training, said it has been a big help in getting the men to think and with at least one very important result: that most grievances are caught and ironed out before getting to his desk. At the South-East company, which went to mechanical mining in 1939 and has a supervisor for each ten men, said Mr. Picklesimer, the training was put on with successful results but it has been difficult to maintain the follow-up which is desirable to continue the upgrading. Mr. Sine said that eight men and he, of his company, took the 40-hour course, then gave it to some 150 foremen. He also thinks well of the training.

Some men have deliberately left foremanship positions to return to worker jobs to avoid the headaches of trying to combat absenteeism and other factors mitigating against getting high tonnage. That conclusion was offered by J. J. Foster, assistant to the vice president, Island Creek Coal Co., as one of many reasons why some type of foremen's training program should be under way at all times. In his paper, "Mine Management," he predicted that a "most acute shortage of competent management" will be one of the many perplexing problems of post-war coal production.

Mr. Foster reported excellent results from "Training Within Industry" at

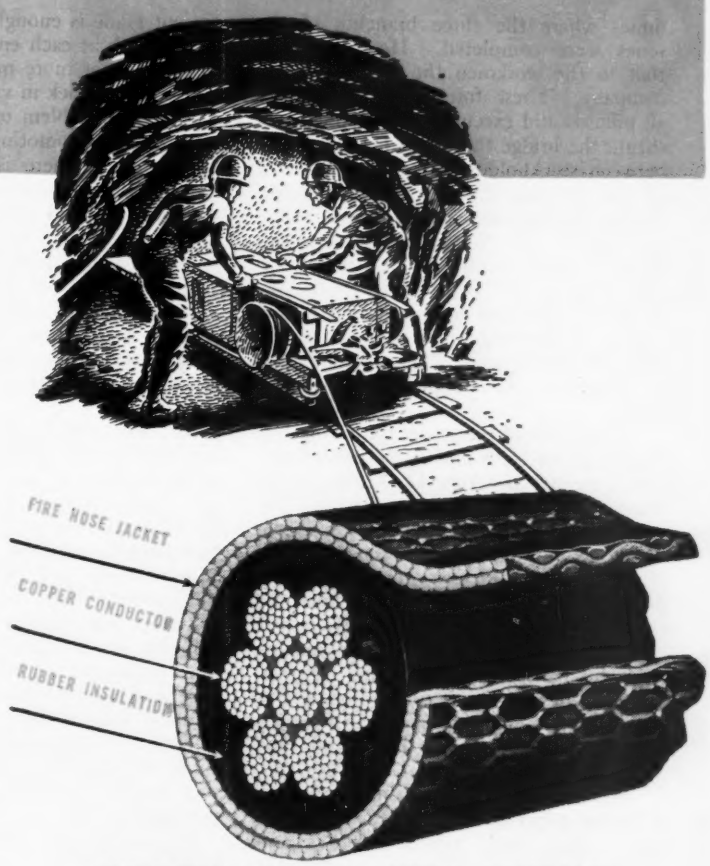
While Lindsay Cobb reads his paper Mrs. R. W. Dickinson, recorder for the meetings, studies the mine map. She resides at Liggett, where her husband is superintendent and cashier of the Mahan-Ellison Coal Corp.

A few of the members and associates of the committee which compiled the "Coal Mining Reference Book." Standing: A. D. Sisk, J. F. Bryson and L. W. Huber. Seated: W. H. Tomlinson, Paul M. Jones and J. B. Allen.

Banquet. O. W. Evans, general superintendent, N. & W. Fuel Department, toastmaster; Governor S. S. Willis; Steve Walkers, chairman, State Highway Commission; and Beverly Waddell, chairman, Workmen's Compensation Board.

Fire-hose-jacketed Duracord

ONE OF THE TOUGHEST, PORTABLE CABLES YOU EVER LAID DOWN IN A TUNNEL



DEVELOPED 25 years ago, Duracord has been time-tested and proved under the toughest conditions. The fact that it saves rubber in mining cable is only one of its present advantages.

Duracord is extra tough because it is covered with a Fire-hose Jacket.

This covering is *woven—not braided* . . . an important difference when it comes to strength and toughness. And it is imbedded in the belt, for extra tensile strength.

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"What happens to the men? Well, frankly Mr. Webster that's been puzzling me."

mines where the three branches of the series were completed. He emphasized that to the workmen the foreman is the company. These foremen, together with all officials and executives above him, constitute the bridge that must be maintained between stockholders and the workmen if all are to prosper. An address by Mr. Foster covering some of the same ground and read at the Nov. 24 meeting of the West Virginia Coal Mining Institute is abstracted on p. 76 of this issue. Mr. Foster is a member of the National Association of Manufacturers' committee on supervisory problems, which has published a pamphlet on "Supervisory Management."

"The Value of Barricades for Saving Life During Mine Fires and After Explosions" was discussed by Alex U. Miller, U. S. Bureau of Mines, Mt. Hope, W. Va. He said that 876 lives were saved by barricading in the 42 disasters between 1909 and 1939 and that 143 lives were lost in that period behind barricades. He reviewed the data on mine disasters in this country and outlined the procedure for making ready for barricades, the method of erecting and conduct for barricaded men. For further details he referred to the Bureau's circular No. 42, by D. Harrington and W. J. Fene.

"Mine Scales and Weighing Methods," a 21-page paper by Harry M. Roeser, manager, sales and service department, Streeter-Amet Co., Chicago, covered the practical considerations of scale construction, capacity, weight-rail length, motion weighing, track grades, location, tonnage control, tare weight control and the tracing of leaks between tipple and railroad weights.

Emphasizing the need for capacity, he said the experienced scale man will recommend a unit of two to three times the actual capacity needed. In gravity weighing with anti-friction bearing cars, 0.25 percent grade is enough for scale rails and a car length at each end, while a grade of 1.5 percent or more may be necessary for other rolling stock in various conditions.

After the problem of weighing the coal correctly and promoting confidence in the scale are licked there usually comes that of explaining the discrepancy between mine scale and railroad weights. The normal shortage is about 0.5 to 0.75 percent. Inadequate tare weights are responsible for many of the cases of greater shortages. Weighing all cars once a month is not too often in keeping tare weights adjusted to seasonal and other variations. Mr. Roeser outlined a complete procedure for tracing shortages.

Mr. Sisk, who for five years was a scale inspector for the State of Kentucky, called attention to the fact that Mr. Roeser spent many years in the scales division of the U. S. Bureau of Standards. Mr. Sisk said there is no general text on the subject of mine scales and he found that miners and operators knew less about scales than any other feature of mining.

Henry A. Spaulding, mining engineer, Hazard, presented a paper on valuation of coal properties. To illustrate the principles involved and the requirements for taxation he chose several actual examples of certain mines not named, tracing their accounting over long periods and pointing out errors and results.

Discussing mine fires and explosions in Kentucky in 1944 to date, Mr. Patterson happily had but three serious cases upon which to report, with one man lost. The fire at Copper Ridge mine, still sealed at the date of the meeting, was caused by the burning of a synthetic rubber cable and was the third example of similar trouble from these cables. Contrasted to natural rubber, in which fires from an arc usually will not travel along a stretched-out cable, a fire on a synthetic cable, according to Mr. Patterson, will travel clear back to the nip. He said there was no indication that fumes from burning of the synthetic rubber contain any gases more poisonous than from natural rubber.

Mr. Sine told of a case where a single-conductor No. 2 locomotive cable of synthetic rubber got under the end of a steel tie, the weight of the locomotive forcing the tie against the bottom and thus grounding the cable, causing an arc and fire which burned for some distance back toward the nip. In this instance a workman claimed to have been floored by the smoke and gas. As a test, fires under similar circumstances were staged twice. Analyses of samples of the smoke from these tests failed to show poisonous gases. In the second test, in which about twice as much cable was burned as in the original accident, the safety engineer exposed himself for several minutes to the

Kentucky Institute Officers

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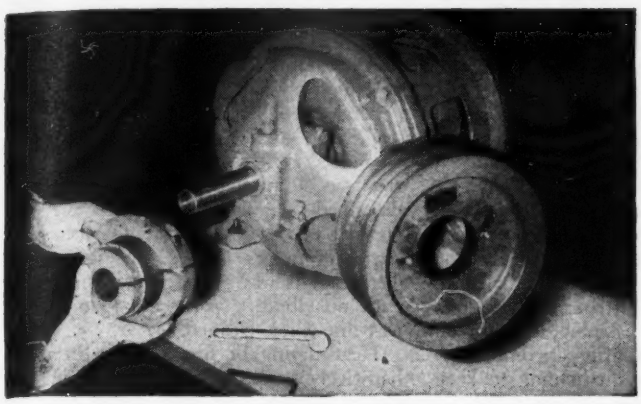

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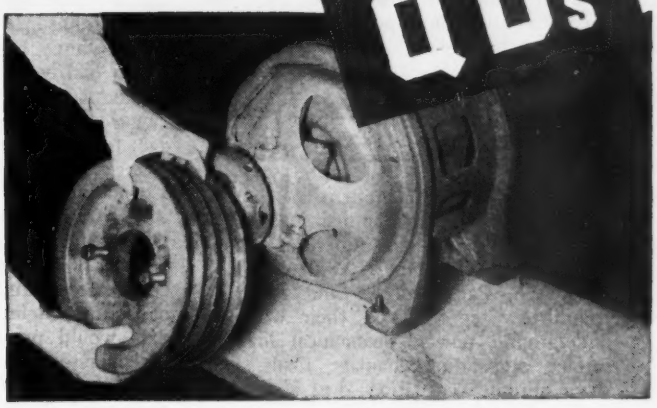

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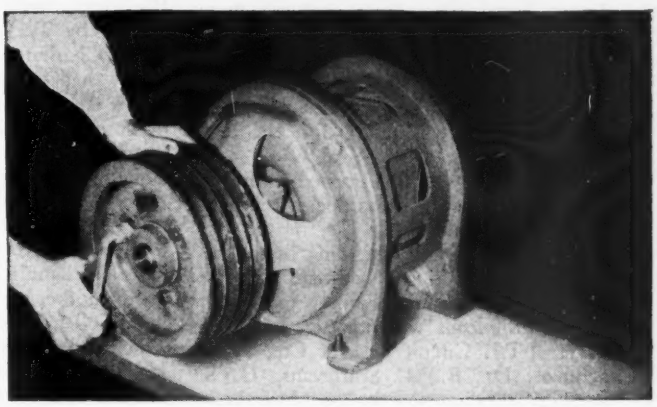

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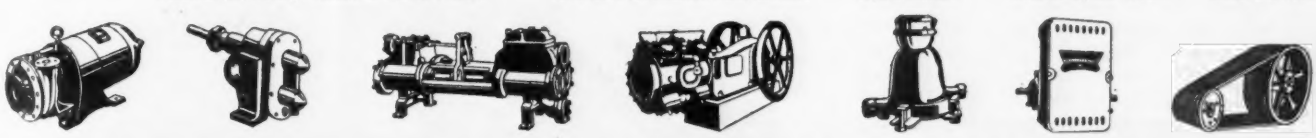

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dense smoke and felt no irritation of the eyes.

Mr. Picklesimer affirmed the concern that synethetic-cable fires are giving the coal operators. He suggested the best remedy is to keep the cables in good repair, including vulcanizing joints and damaged places as soon as possible.

Mining Congress Hears Coal Division Reports

Problems arising in modern coal mining were discussed at the annual meeting of the Coal Division of the American Mining Congress at the Hotel William Penn, Pittsburgh, Pa., Dec. 14 and 15, with committees reporting on their work on underground power, mechanical loading, surface preparation, haulage roads, conveyor mining, ventilation, dust abatement and roof action.

In addition, wartime trends of the industry both here and in Great Britain were discussed at the luncheon session, and at dinner Larry Allen, thrice-captured Associated Press war correspondent, related his experiences and told the audience that soldiers on the war front would hold the home front accountable for any failure to provide adequate support for the war effort.

The morning session opened with the report of the power committee, with D. E. Renshaw, Westinghouse Electric & Mfg. Co., East Pittsburgh, presiding in the absence of C. C. Ballard, chairman. Progress on color coding underground for motor and control leads was reported by D. J. Baker, I-T-E Circuit Breaker Co., Philadelphia. Dr. E. G. Sturtevant, U. S. Rubber Co., discussed the use of synthetic materials on wire insulation and cable jackets.

A number of recommendations for distribution of primary power at voltages of 2,400 and 4,160 were made by R. S. Sage, General Electric Co., Schenectady, N. Y. Three wiring arrangements for outdoor transformer stations were submitted, in all of which the arrangements were for carrying power from the utility lines to high-voltage lines serving the mine feeders. The first arrangement was particularly for especially important stations where the flexibility of a primary circuit breaker was desired. The second was the same as the first except with horn-gap group-operated disconnecting switches and with primary fuses instead of a circuit breaker, and the third was similar to the first but was extended to show one mine feeder leaving the station on a surface pole line.

Present-day trend in transformers, Mr. Sage said, is toward the use of three-phase units because of lower first cost, saving in installation and materials, and less space requirements. They should be oil-immersed and self-cooled, he recommended. Incoming line circuit breakers were advised over fuses and should have adequate interrupting and short-time current capacity to withstand the short-circuit currents which the system is capable of developing. Mr. Sage said the committee was preparing next to study low-voltage distribution.

J. A. Younkins, coal division, Duquesne Light Co., was in charge of the report submitted by the committee on mechanical loading, which, he said, had devoted its studies in large measure to service haulage and the effect on it of roof and floor conditions, drainage, ventilation and grades. E. H. Johnson, Jeffrey Mfg. Co., Columbus, Ohio, told about questionnaires which had been submitted to various coal mining companies to determine the efficiency of various methods of service haulage, but said insufficient replies had been received to permit the committee to reach a conclusion.

The rate of depreciation and amortization of mechanical loading equipment, especially of mobile loaders, was part of the committee's study, and N. G. Alford, consulting engineer, Pittsburgh, said such data would provide valuable information for operators in computing income taxes and for manufacturers in helping to keep equipment closer to new designs.

Surface preparation and the recovery of salable coal from gob, mine rock and preparation plant rejects was the subject of the committee on surface preparation, headed by T. W. Guy, consulting engineer, Charleston, W. Va. He said a survey had revealed that 4,000 tons of coal a day, or two tons for each 100 tons of normal production, could be recovered from mine rock in the Pittsburgh area alone.

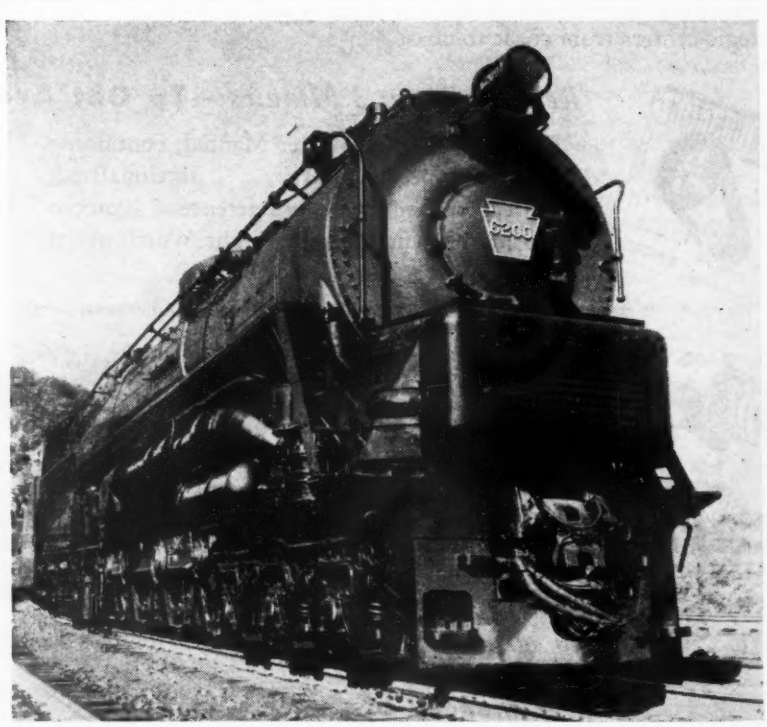
In another instance, Mr. Guy said, 20 tons of coal, or between 13 and 14 percent, had been recovered from refuse at a cleaning plant handling 145 tons per hour. He cited another instance of a mine producing 5,500 tons of metallurgical coal a day which had adopted full seam mining, loading 500 tons of rock and slate a day separately, sending it all to the washer and recovering 175 tons of steam coal. Seam partings, roof coal and drawslate are all loaded together. The result of this system has been to get 9 tons of steam coal for every 100 tons of metallurgical coal, increase the yield per acre, increase the yield of metallurgical coal per manshift, help the washer to produce better coking coal, increase mine height so cars can be loaded higher, improve safety conditions by removing drawslate overhead, and effect a general over-all reduction in costs.

J. M. Gonder, chief chemist, Koppers Coal Division, Pittsburgh, discussed electrostatic cleaning of fine coals, which he described as a natural complement to wet and dry processes of cleaning coarser coals. Two advantages of the process, he said, were that it was operated as a single unit with no vibrating parts and that the coal was dry when cleaned.

Heat drying of fine coals is being exhaustively studied, A. L. Davis, Link-Belt Co., Chicago, said and added that the results were promising. He said he believed the process could be successfully used without pre-oxidation, or destruction of either coking values or fuel properties of the coal.

Executive Secretary Julian D. Conover presided at the luncheon meeting, at which Harry M. Moses, chairman of the Coal Division, welcomed the members and urged that they "keep their eye on the ball" and not let postwar problems occupy their attention to the exclusion of the immediate problem of helping to win the war. Off-the-record talks were given by Arthur S. Knoizen, director, Mining Division, War Production Board, on the outlook for mining machinery, and by L. E. Young, consulting engineer, Pittsburgh, on the British coal situation.

The committees on haulage roads and



Pennsylvania R.R.'s new Type S-2 turbine-driven locomotive described in last month's Coal Age, pp. 168 and 170.

How LeTourneau Equipment

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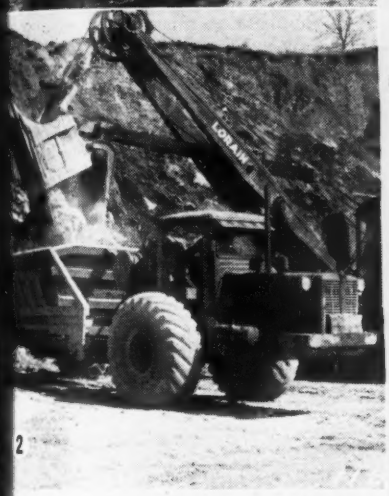


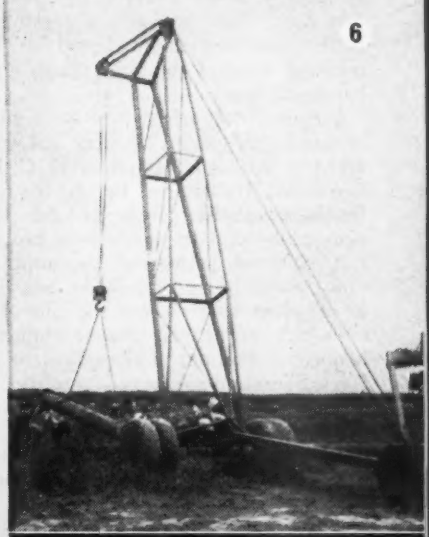
Four Super C Tournapulls are stripping 85 feet of overburden on this Georgia open-pit mine. Speeds up to 14.9 m.p.h. enable them to make 1-mile cycles of load (15 heaped yards), haul, spread and return every 11 minutes . . . give scraper stripping economies over truck distances.

Two Tournatrailers —17 yards (heaped capacity) hauling units—speed long distance hauling of rocky overburden on a Wellsville, Mo., mine. Tournatrailers are quickly interchangeable on the same fast-moving Tournapull prime mover and Power Control Unit used with LeTourneau Carryall Scrapers and Tournacranes.

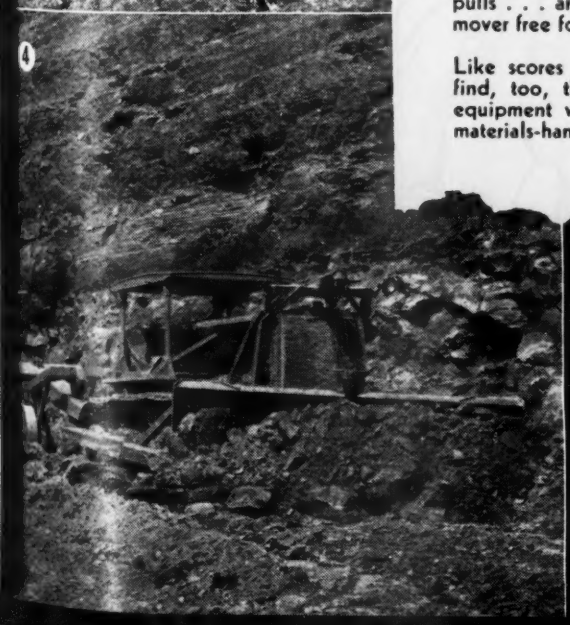
Two LeTourneau Carryall Scrapers removed old spoil piles near Mt. Carmel, Pa. . . . later, stripped overburden from underlying coal deposits. Use of pusher helped get 17-yard heaped capacity loads fast.

LeTourneau Dozer, Rooter and 2 Carryall Scrapers stripped 60,000 cu. yds. of rocky overburden for R. L. Griggs, on a Hopedale, Ohio, coal mine. Here, the Dozer moves rock, which had been broken by Rooter, used in combination with Dozer on the same tractor.

LeTourneau Rooter broke tough shale on this Weirton, W. Va., coal stripping job for low-cost excavation by Carryalls and Dozer. Rooters make cheap scraper dirt of most hard materials—shale, decomposed granite, hard sun-baked clay, etc., . . . save blasting, safer.



LeTourneau 30-foot Crane used by Binkley Mining Co. to lay pipe, near Seeleyville, Ind. These heavy-lifting tools are available for use with either tractors or fast-moving, big rubber-tired Tournapulls . . . are quickly interchangeable, leaving prime mover free for other mining work.



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conveyor mining made a joint report, presented by C. C. Hagenbuch, Hanna Coal Co., St. Clairsville, Ohio, chairman of the former committee. Mr. Hagenbuch said the Mining Congress handbook on switches and turnouts was being completely revised with special emphasis on standard turnouts not included in the original issue, new material on track maintenance, weights of rail, tie spacing and steel ties. Still to be approved were supplementary data on frogs, guard rails and flangeway widths.

The subject of standard flangeway widths and guard-rail spacing is one on which operators and manufacturers should cooperate, A. R. Anderson, Jeffrey Mfg. Co., said, since equipment sometimes has wheels which do not go through flangeways as they should. If a standard is created, he said, it then becomes the responsibility of the manufacturer to make equipment conform. Standard width for flangeway frogs seemed to be 1⅜ in., but thickness and height varied considerably, the committee found. Their study also was impeded, Mr. Anderson said, by differences between track gage and wheel gage. Data on width, depth and spacing of guard rails are now in the hands of the committee and are being studied for creation of standards.

A. E. Long, coal division, New York Central R.R., Indiana, Pa., explained the committee's work on drafting ideal conveyor and track-haulage systems for a hypothetical mine. The mine, using pillar extraction, would get 2,400 tons a day in two shifts from a 4-ft.-8-in. seam. Haulage systems are from room neck to tipple, and in addition to the conveyor and track haulage methods a combination of the two also is being studied. A working map of the mine was exhibited, and Mr. Long outlined some of the work which already has been done.

Frequent volume and pressure surveys of ventilation systems to check leakage was urged by Walter E. Housman, H. C. Frick Coke Co., Uniontown, Pa., in his report for the ventilation committee. Mr. Housman exhibited slides in which he explained two types of permanent measuring stations, which he said should be established in all main splits where the life of the mine warrants it. He also recommended frequent inspections of all permanent stoppings, doors and overcasts.

Mr. Housman offered four general considerations for efficient ventilation: that courses be as airtight as possible; that airways be large and unobstructed; that no water be standing in main aircourses, and that a good ventilation map, as distinguished from a mine map, always be on hand. He said the committee had outlined pressure volume surveys, boreholes as auxiliary airshafts and the cause and effect of air leakage as topics for future study.

For the safety committee, James Hyslop, vice president in charge of operations, Hanna Coal Co., said the committee had not had an opportunity to formulate more than tentative plans, but had appointed a subcommittee on fires and explosions, part of whose work would be to determine the outstanding features of various types of fire-fighting equipment and to test them underground.

Different types of equipment as well as market conditions have a bearing on spraying to lay dust, D. H. Davis, Pittsburgh Coal Co., chairman of the committee on dust abatement, said. While complete piping sometimes is justified, there are four general systems which may be used. In addition to complete piping, water may be piped from an outside source to some central point within the mine; it may be hauled to the face in cars, or it may be dammed and stored. A comparison in costs between piping to each working place and hauling water to the working place at one Pittsburgh mine showed 1¾c. for piping per ton and ¾c. for hauling.

A. C. Arnold, Pittsburgh Coal Co., said his company had selected a 100-percent mechanized mine with average dustiness, and had observed results from water spraying of the undercut, which method, he said, carried over some dust abatement to the loading operations. He gave the following figures for the experiment:

Water (in gal.) per ton of coal in cut	Dust concentration in million particles per cu. ft. of air: Cutting	Loading	Percent dust reduced: Cutting	Loading
0	238	176	...	...
0.30	46.9	68.0	80	61
0.50	42.2	61.5	82	65
0.66	46.5	52.3	80	70
0.83	38.4	36.8	84	80

He said that when a solution of Aersol had been added to the water, an approximate 20 percent additional dust reduction had been observed in mine operation.

Too much has been left to chance and not enough study has been made of character of roof shales, Frank G. Smith, Sunday Creek Coal Co., Nelsonville, Ohio, stated in his report as chairman of the committee on roof action. As a result, much of the committee's work has dealt with classification of roof rocks, the effects of weathering, analysis of shales, and the results of specific instances of mine-roof sealing.

Details of an experiment being conducted at one of the Pittsburgh Coal Co.'s mines was related by Henry Hebley, director of research of that company. Thirty areas were selected and divided into 15 pairs, each 100 ft. long, all located in the same position on the air currents and all in the same sector. Alternate areas were painted, but it is still too early to tell the effects of the application since it has been on less than a year. Mr. Hebley said, however, that the current count shows more falls of roof in the treated than in the untreated sections. Mr. Smith added that the Pittsburgh experiment served to emphasize the difficulty of coming to conclusions on roof action.

"Now that the old lady's found out that nylons are made outa coal, water an' air, she won't give me a minute's rest till I get the recipe for her."

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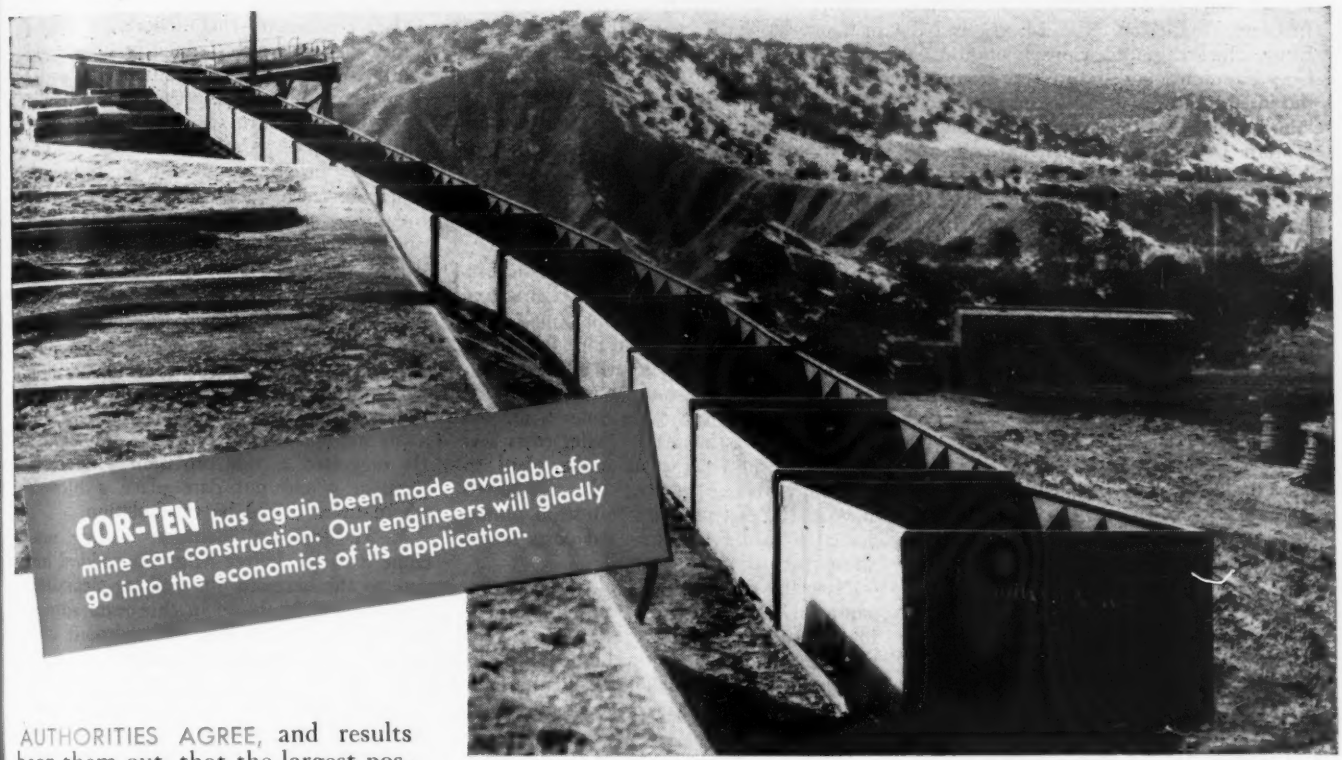
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AUTHORITIES AGREE, and results bear them out, that the largest possible capacity mine car should be used in any operation. For it has been shown that the time lost per ton due to car changes decreases rapidly as the capacity of the car increases up to 6-tons—is somewhat less rapid as size increases beyond this figure.

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You pay no premium for using COR-TEN. In thousands of installations this superior high strength steel has proved that its proper use will increase capacity and save weight with little increase in cost.

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UNITED STATES STEEL

Current and Postwar Problems Debated

W. Va. Institute Discussions Cover Thin Seams Vs. Thick, Power Comparisons for Hand and Mechanical Loading, and Growing Importance of Personnel Management

MECHANICAL MINING in thin coal, power comparisons for hand and mechanical loading, personnel relations and safety were the subjects at the 37th annual meeting of the West Virginia Coal Mining Institute, Charleston, Nov. 24. D. L. McElroy, chief engineer, Consolidation Coal Co., Fairmont, and retiring president of the institute, opened and steered the meeting. Laurence E. Tierney Jr., president, Eastern Coal Corp., Bluefield, and new institute president, was chairman of the morning technical session. Joseph Pursglove Jr., president, Pursglove Coal Mining Co., Morgantown, presided over the afternoon session.

At luncheon Ralph C. Mulligan, National Coal Association, set forth his ideas of what is ahead for business in the light of the November elections. At the banquet Edward R. Burke, president, Southern Coal Producers' Association, spoke on "The Coal Operator and His Government." Senator Burke said he fears that the administration, continued in office because of the foreign crisis, will take the election as a blanket approval of its domestic policy. At home and abroad, he said, there has been a loss of faith in free enterprise and a growing reliance on government. In the management of the lives of the people a line must be drawn and that line will be determined in the postwar period. He said it is clear that high taxes will be with us for a long time.

Although Mr. Mulligan expects to see a high level of production after the war and an elapse of several years before a postwar slump occurs, "if it comes" he sees that the new Congress will swing farther toward administration policies than gains in the election would indicate. There will be further social legislation, bigger appropriations, creation of regional authorities patterned after TVA, public works programs larger than anything in the past. The government has hydroelectric plans equaling 30 percent of the existing steam plants of the country. Federal crop insurance has been promised to the farmers. Price and other controls will exist during the next four years and there will be no attempt to balance the budget. He termed as "financial dynamite" the trend toward inflation, one indication of which is the 25 billion dollars of money now in circulation compared to six billions in 1933.

Why Thin Seams Can Compete

Carel Robinson, of Robinson & Robinson, consulting engineers, Charleston, talked on "Mechanization in Thin Coal." In arriving at the conclusion that thin-seam coals can compete with thick coals he pointed out that only about 25 percent of the total cost to the consumer is affected by thinness of the seam. Sales costs and transportation costs from mine plant to consumer are no greater. He recounted how in the early thirties thin-seam mines, forced to conveyors, achieved costs under those in thick coals.

Now the pendulum has swung back because of the widespread installation of loaders in thick seams. At present thin seams are handicapped by the necessity for making additional height, difficulties in delivering supplies, cost of cutting and haulage.

Providing greater headroom for man travel and shortened underground travel, where possible to make new openings, were advocated by Mr. Robinson. For moving supplies be pointed to the recent development of a double-drum hoist mounted on a crawler truck for dragging machinery, conveyor pans, timbers and so on. He would like to see developed for thin coal the timber-setting truck with circular saw now used in thick coal. In cutting, more attention should be paid to special bits, and bugdusting should be done by machine.

He mentioned that Goodman has a cutter with bugduster which is doing good work, that the Jeffrey 43L cutter and loader is again on the market and that hydraulic finger-touch control has been developed for a top-cutting shortwall so that the undulations of the seam can be followed. Duckbills have been improved so that they move across the face under their own power. He said that adequate heading height should be provided for large mine cars and for man travel and that better illumination is needed at the face.

Other needs for the mining of thin coal are better roof jacks, better fog nozzles for dust allaying, a caterpillar supply car to go right up to the face and a safe method of using blowers and tubing. He suggested a code provision whereby a foreman would not dare place a blower where there would be recirculation.

E. H. Johnson, manager, loading machine division, Jeffrey Mfg. Co., added his vote to the necessity for walking clearance on the main haulways in thin-seam mines and declared that a lack of headroom is a dangerous complication in case of an accident. Regarding the competition between thin and thick coals, he said that most of the former are clean while most of the remaining thick coals contain banded impurities.

John L. Clarkson, president, Clarkson Mfg. Co., Nashville, Ill., mentioned the future possibility of the operator of a loading machine being stationed off to one side or at any other safer position during loading and tramming, this being accomplished by adding a control cable con-

Snapped at the close of the morning session (left to right): Standing—D. L. McElroy, Charles T. Holland, William H. Noone Jr., J. C. Cree and C. W. Connor. Seated—R. H. Morris, John T. Sydnor, J. J. Foster, Joseph Pursglove Jr. and Laurence E. Tierney Jr.

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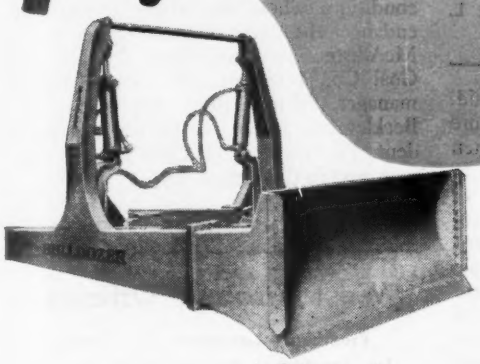
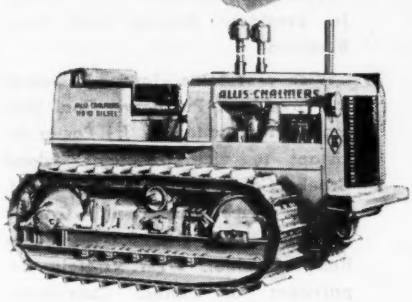
They Go Together!





BAKER

A-C

Baker Bulldozers + Allis-Chalmers Tractors = performance. Just like a bolt and a nut or a comb and brush go together—so do Bakers go with Allis-Chalmers Tractors. Every unit in the complete Baker Bulldozer and Gradebuilder line is "tailor-made" for installation on A-C Tractors—*a model for every size crawler tractor.*

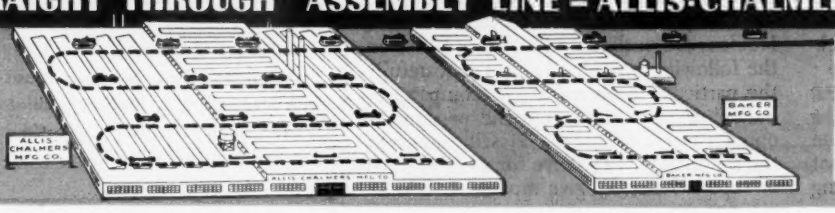
Here are two organizations working side by side—each a specialist in its chosen field—giving you all of the benefits of a tractor-bulldozer unit "designed and made under one roof." From the very inception of a new tractor or tractor equipment, engineers of both firms confer on design and dovetail plans. Here, too, is a nationwide dealer organization equipped to render super-service on tractor and bulldozer alike. *Thousands of users among contractors, public works officials and in many industries will verify that Baker Bulldozers or Gradebuilders and A-C Tractors go together!*

THE BAKER MFG. CO.

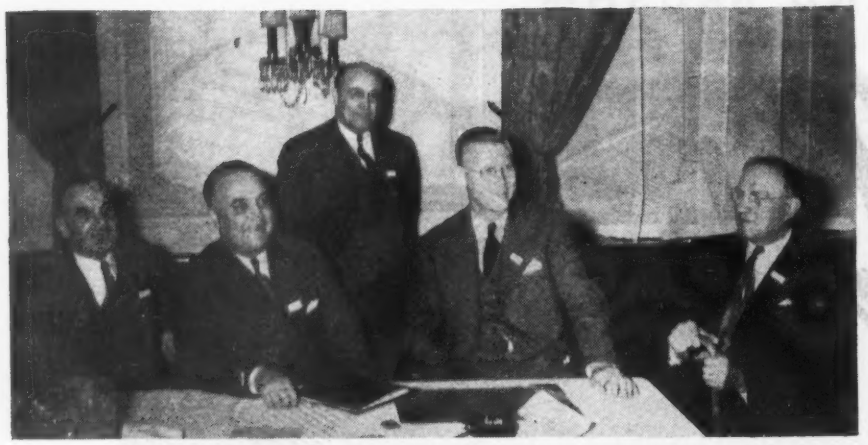
514 Stanford Ave. Springfield, Ill.

If it concerns Victory, it concerns us!

"STRAIGHT THROUGH" ASSEMBLY LINE – ALLIS-CHALMERS TO BAKER TO YOU!



The modern Baker plant with its completely equipped fabricating, machining and blacksmithing shops adjoins the Allis-Chalmers crawler tractor plant. When you order an A-C tractor with Baker bulldozer or gradebuilder, your tractor leaves the A-C assembly line, crosses a narrow court and goes on the Baker final assembly line.



At the close of the afternoon session (left to right): Lionel Farr, J. J. Foster, John L. Clarkson, Joseph Pursglove Jr., and Carel Robinson.

nected to a portable control station which the operator would carry. Mr. Clarkson said he gave this idea little weight when first suggested to him but now sees its possibilities.

Lionel Farr, Goodman Mfg. Co., Chicago, averred that many returning service men who left mines that were not highly mechanized will have gotten push-button minded as a result of experiences with radar and other advanced equipments and so will be reluctant to return to coal unless it has new, interesting and convenient machinery to operate.

Mr. Farr emphasized the need for constant, smooth and continuous flow of coal from face to discharge point. More of the rock and refuse should be left in the mine and in the future more attention will be given this phase. Every explosion, he said, brings closer federal legislation which will limit underground machinery to permissible types.

In a paper comparing power requirements for hand loading and mechanical loading, J. C. Cree, West Virginia Engineering Co., Charleston, said that cutting and drilling consumptions remain the same, room conveyors take 10 percent more than gathering locomotives, and loading machines require about 0.15 kw.-hr. per ton. He finds that the face consumption per ton is not materially increased by mechanical loading but that greater substation capacities are required. In his paper (p. 79 of this issue) he compares the actual power data for 1929 hand loading and 1942-3 mechanical loading for three mines with which he has been familiar over the years.

Rules Alone Insufficient

Safety rules are a good thing but their existence does not obviate the necessity to teach the workmen to think and to remind them to think daily, was the point of "Some Observations on the Safety Movement," by N. A. Elmslie, division superintendent, Industrial Colliers Corp., Barrackville.

He has observed that both management and the workmen lean too heavily on the rules and standards when such have been set up. They incline to the feeling that once the rules are made they have nothing to worry about. On the contrary, he said, the more safety rules we have, the more personal contact is necessary with the men to convince them that rules alone are in themselves not a protection.

Mr. Elmslie stressed the need for co-operation between the safety management and operating management. As an example he cited the instance of a safety engineer making a recommendation to correct a bad practice or condition by a certain method while the operating management suggested a different method which the engineer readily agreed was better.

Enforce Rules Before Disaster

That safety rules should be enforced before an accident, not after, was the contention of C. L. Haeberlin, State compensation commissioner, Charleston. He finds too much reliance put on the rules themselves—"safety cannot be ordered, sold by the yard or by the pound." Investigation after an accident in which a rule was violated seldom reveals that any man was dismissed for an earlier violation of that rule. The most difficult job of the commissioner springs from the law's provision that compensation can be denied a man violating a company rule previously approved by the commissioner.

Later in the meeting when Mr. Haeberlin was invited by the chairman to "report" on the compensation department he said that 1943 was the first year that the coal industry was in the black and that 1944 will be the second. From memory he gave in round figures the totals of invested and catastrophe funds, indicating a healthy increase. During the last three years the administrative cost has been less than 3½ percent of the funds received.

Many things could and should be done about employee relations in the coal industry to prevent loss of many of the better employees and of potential employees, declared J. J. Foster, assistant to the vice president, Island Creek Coal Co., Holden. He outlined a procedure based on the following points: (1) analyze carefully the particular problem of the company or individual mine, (2) raise the personnel's opinion of the industry, (3) sell mining to the schoolboys, (4) strive for a higher type of supervision, (5) give more attention to employment procedure, (6) apply careful study and consideration to placing returning veterans, (7) increase the training of men on the job, (8) train and improve the foremen, (9) promptly handle grievances, real or imaginary, and (10) recognize the need for better housing. Mr. Foster's paper is abstracted beginning on p. 76 of this issue.

In discussion, S. R. Purslove, secretary, Purslove Coal Mining Co., Morgantown, advocated weeding out incompetent and marginal men, of which the coal industry, according to him, has absorbed more than its share. If a man cannot get along with his neighbors it should be a favor to him if he is forced to some other job where he does not have to work in such close co-operation with other people and under conditions where one man's actions may endanger the safety of many others. H. A. McAllister, vice president, Clean Eagle Coal Co., Logan; R. H. Magee, district manager, Mine Safety Appliances Co., Beckley; and Roland C. Luther, vice president, Peerless Coal & Coke Co., Vivian, took part in the discussion.

West Virginia Officers

President—Laurence E. Tierney Jr., president, Eastern Coal Corp., Bluefield.

Vice presidents—Joseph Pursglove Jr., president, Pursglove Coal Mining Co., Morgantown; J. J. Foster, assistant to vice president, Island Creek Coal Co., Holden; R. H. Morris, vice president, Gauley Mountain Coal Co., Ansted; Jesse Redyard, chief, West Virginia Department of Mines, Charleston; George R. Higinbotham, assistant to vice president in charge of operations, Consolidation Coal Co., Fairmont.

Secretary-Treasurer—G. R. Spindler, assistant director, School of Mines, West Virginia University, Morgantown (on leave to work for British Ministry of Fuel and Power). Acting secretary-treasurer is Charles T. Holland, assistant professor of mining engineering and instructor, mining extension department, West Virginia University, Morgantown.

Executive Board—C. W. Connor, vice president, Colcord Coal Co., and manager, mining division, American Rolling Mill Co., Colcord; W. G. Crichton, vice president, Johnstown Coal & Coke Co., Charleston; Truman Johnson, secretary, Northern West Virginia Coal Operators' Association, Fairmont; John T. Sydnor, president, Rail & River Coal Co., Wheeling; D. L. McElroy, chief engineer, Consolidation Coal Co., Fairmont.

WOOD Specialization
-assures a BETTER TOOL to work with

Big Fist Coal Shovels have been specially designed to meet the requirements of practical coal men . . . men who know how a coal shovel should be built. As a result of this specialized designing, these shovels are easier to work with, and enable the men who use them to actually do more work and do it with less fatigue. At your first opportunity, test Big Fist Coal Shovels on your hardest, most back-breaking jobs. You'll prove to yourself what so many coal mining men have already learned . . . Big Fist Coal Shovels are the champion shovels of the coal mines of America.

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Open Back Coal Shovel with Steel I-Beam Handle Reinforcement.

A National Organization *Specializing Exclusively* in Shovels, Spades and Scoops.

The WOOD SHOVEL
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PIQUA, OHIO
The EXCLUSIVE Steel I-Beam found only in Shovels Made by Wood
Adds 30% and MORE STRENGTH where 65% of handle breaks occur.

A.F.L. Again Invites Lewis to Return

John L. Lewis, United Mine Workers president, received notice Dec. 20 that the American Federation of Labor was receptive to reaffiliation of the miners' union. There was nothing to indicate, however, that the letter, signed by William Green, A.F.L. president, was anything more than a formality, implementing the action of the A.F.L. convention in New Orleans in November.

There has been no outward indication that Mr. Lewis has receded from his position that the federation accept U.M.W. "as is" and settle jurisdictional matters afterward, which caused a cessation of previous negotiations. A.F.L. wants District 50, catch-all unit of U.M.W., broken up and apportioned among the appropriate international unions of the federation.

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New Producers And Reopenings Planned

Development of a new coal operation has been launched by the Guests River Coal Co. near Big Laurel, Va., on upper Guests River, Wise County. The new operation, it is reported, is to be developed to produce 1,000 tons daily, which will be shipped over the Norfolk & Western Ry., recently extended into this field.

Additional leases are being made by Bell & Zoller Coal & Mining Co. in Douglas County, Illinois, to cover proposed mining areas near Murdock served by the Baltimore & Ohio R.R., where the company already had several hundred acres under lease. Plans announced earlier for new test holes and the sinking of a mine shaft are progressing according to schedule, the project to be under way this spring with mining on a small scale. Full production of a million tons a year is not expected to be reached until 1947. The mine is to be about 140 miles south of Chicago, with freight service over the B. & O., Alton, Illinois Central and Chicago & Eastern Illinois railroads.

To increase its output of anthracite, the Lehigh Valley Coal Co., Wilkes-Barre, has started to pump the water from its Maltby colliery, abandoned ten years ago. The permanent pumping plant will include two 1,500-gal. pumps against a head of 465 ft., operated by 2,200-volt motors. When the mine has been dewatered, proper ventilation will be provided by a new fan with a capacity of 250,000 cu.ft. per minute. A 300-hp. motor with the necessary equipment and transmission lines will drive the fan.

Radium mine, Belleville, Ill., is likely to be reopened soon, according to Kenneth Woosley, Collinsville, who purchased the mine from the Aluminum Ore Co., East St. Louis, in early December. Before being closed in 1932 the operation employed more than 200 men. Three maintenance men have been kept on the property in the meantime, and State Mine Inspector Fred Lippert, who inspected the mine recently, said coal could be hoisted two weeks after work began.

G. J. Stollings, vice president and general manager of the Mallory Coal Co., has purchased the remaining leaseholds of the company and will operate them under the name of the Stollings Coal Co. The Mallory concern, which has operated in Logan County, West Virginia, for 27 years, has been dissolved, according to an announcement Dec. 17 by its president, James D. Francis, who reported that coal in the leaseholds was almost exhausted and that two of the organization's mines already had been closed.

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To Name New Mine For George B. Pryde

Some day the Union Pacific Coal Co. will build an even better mine than the D. O. Clark or the Stansbury, and above its portal will be inscribed the name of George B. Pryde, said Eugene McAuliffe, chairman of the company's board of directors, to 120 diners at a banquet given Nov. 29 in the Old Timers building, Rock Springs, Wyo. The dinner, in honor of Mr. Pryde, recently retired vice president of operations, was given by staff members of the company.

Extolling Mr. Pryde's ability as a mining man and his loyalty to the company, Mr. McAuliffe stressed his "absolute justice in labor relations and his persistent desire to reduce mine accidents and to make living conditions for workers more acceptable." At the close of his remarks he presented to Mr. Pryde a gold watch and chain from staff members, the watch bearing this inscription: "Presented to George Brown Pryde. After half a century of service with the Union Pacific Coal Co. his fellow workers present this token of affection and appreciation, Nov. 1, 1944."

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Coal-Mine Fatalities Ease Still Lower

Accidents at coal mines of the United States caused the deaths of 76 bituminous and 11 anthracite miners in October, last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With a production of 51,500,000 net tons, the accident death rate among bituminous miners in October last was 1.48 per million tons, compared with 1.50 in the preceding month and 1.52 in October, 1943.

The anthracite fatality rate from accidents in October last was 1.97, based on an output of 5,588,000 tons, against 2.20 in the preceding month and 2.85 in the tenth month of 1943.

For the two industries combined, the accident fatality rate in October last was 1.52, compared with 1.57 in the preceding month and 1.65 a year earlier.

Fatalities during October last, by causes and states, as well as comparable rates for the first ten months of 1943 and 1944, were as follows:

U. S. COAL-MINE FATALITIES IN OCTOBER, 1944, BY CAUSES AND STATES

State	Underground: Falls of Roof	Falls of Face	Haulage	Explosives	Electricity	Machinery	Mine Fires	Total Underground	Open-cut	Surface	Grand Total
Alabama	3	..	1	..	..	..	..	4	..	..	4
Arkansas	1	..	..	..	..	..	..	1	..	..	1
Illinois	4	..	2	..	..	..	..	6	1	..	7
Indiana	1	..	..	..	..	..	..	1	..	..	1
Kansas	..	..	..	..	..	..	..	..	1	..	1
Kentucky	6	2	4	..	..	..	..	12	..	1	13
Maryland	1	..	..	..	..	..	..	1	..	..	1
Montana	1	..	..	..	..	..	..	1	..	..	1
Ohio	3	..	..	..	..	..	1	4	..	..	4
Penna. (bituminous)	5	..	..	1	1	..	..	7	..	..	7
Tennessee	..	..	1	..	..	..	..	1	..	..	1
Utah	1	1	..	..	..	..	..	2	..	..	2
Virginia	..	..	4	..	..	..	..	4	..	..	4
West Virginia	16	1	7	1	..	2	..	27	..	1	28
Wyoming	..	..	..	..	..	1	..	1	..	..	1
Total bituminous	42	4	19	2	1	3	1	72	2	2	76
Penna. (anthracite)	6	1	1	1	..	..	..	9	2	..	11
Grand total	48	5	20	3	1	3	1	81	4	2	87

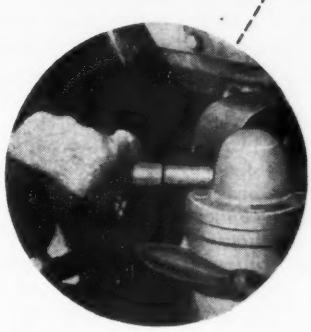
DEATHS AND FATALITY RATES AT U. S. COAL MINES, BY CAUSES OF ACCIDENTS*

January-October, 1943 and 1944

Cause	Bituminous: Number Killed		Bituminous: Killed per Million Tons		Anthracite: Number Killed		Anthracite: Killed per Million Tons		Total: Number Killed		Total: Killed per Million Tons	
	1943	1944	1943	1944	1943	1944	1943	1944	1943	1944	1943	1944
Underground:												
Falls of roof and coal	541	461	1.104	.880	99	67	1.959	1.223	640	528	1.183	.913
Haulage	204	183	.416	.349	30	18	.593	.329	234	201	.433	.347
Gas or dust explosions:												
Local	26	8	.053	.015	1	2	.020	.037	27	10	.050	.017
Major	136	22	.278	.042	14	...	.277	....	150	22	.277	.038
Explosives	26	14	.053	.027	8	15	.158	.274	34	29	.063	.050
Electricity	31	27	.063	.052	1	3	.020	.055	32	30	.059	.052
Machinery	25	27	.051	.052	1	0	.020	....	26	27	.048	.047
Shaft	7	4	.014	.007	1	5	.020	.091	8	9	.015	.015
Miscellaneous	25	89	.051	.170	10	12	.198	.219	35	101	.065	.175
Stripping or open-cut	20	24	.041	.046	9	7	.178	.128	29	31	.054	.054
Surface	51	40	.104	.076	18	9	.356	.164	69	49	.127	.085
Total	1,092	899	2.228	1.71		138	3.799	2.520	1,284	1,037	2.374	1.793

* All figures subject to change.

Westinghouse hydraulic brakes



pay-off points

Here are some actual results reported by a user:

- Brake shoe life increased from one week to three months
- Wheel turning decreased 50%
- Motor bucking to check speed or stop entirely eliminated
- Shocks to mechanical and electrical equipment greatly reduced
- Less sand required . . . better rail contact cuts power loss and overheating

It sounds odd to say that the way to speed-up haulage is to put the brakes on . . . but it's true, if they are *Westinghouse Hydraulic Brakes*.

You can *increase* trip speeds, because of the positive, dependable control on grades, because of the quicker stops, and because of faster, more accurate spotting.

You can *increase* locomotive loads, availability, and utilization. Motors aren't wracked and strained because of bucking loads on grades. Tires and shoes wear less, because the quick, powerful application eliminates any need for dragging, and because braking pressure can be instantly decreased by a slight handle movement if wheel-slipping starts.

You can *increase* safety. Motorman fatigue is lessened. Emergency applications can be made instantly. Interlocks with the controller can be provided to apply brakes automatically if controller handle is unintentionally released, as well as interlocks with the cable reel, which applies brake fully and prevents cable being pulled from reel.

The Westinghouse hydraulic brake utilizes existing rigging. You can install it any time a locomotive is in the shop. Ask for our bulletin SP-9092.

Westinghouse Air Brake Company

INDUSTRIAL DIVISION

General Offices: Wilmerding, Pa.

76 Years of Pneumatic Control Experience

Coal Institute Studies Safety

Electrical Installations, Effects of Multiple Fans and Methods of Fighting Mine Fires Discussed at Pittsburgh—Main-Line Haulage, Coal Trends Also Sifted

DISCUSSION of improved practices, efficient main-line haulage and the future trends of coal, with special emphasis on the prevention and fighting of mine fires, highlighted the 58th annual meeting of the Coal Mining Institute of America, held Dec. 7 and 8 at the Fort Pitt Hotel, Pittsburgh, Pa. John M. Connor, West Penn Power Co., Pittsburgh, was elected president to succeed G. J. Steinheiser, State mine inspector, Uniontown, Pa.

Nine speakers covered the subject of mine fires, tackling them from three major angles: electrical installation, equipment and procedure for fighting fire, and the effects of various systems of ventilation on fires.

"One of the first important considerations in the prevention of mine fires," said John F. Conrad, electrical inspector, Pennsylvania Department of Mines, "from a standpoint of ignition by electricity, is the installation of the electrical equipment and system." Mr. Conrad listed these points as important: trolley wire properly aligned and suspended not less than 6 in. outside the line of the rail on suitable insulators spaced not more than 24 ft. apart; proper switches to disconnect power from entire mine; elimination of excessive sag in trolley wire; fire-resistant guards not more than 5 in. apart on a tangent and not more than 8 in. apart on curves; trolley frogs, sectionalizing switches and inclosed automatic circuit breakers at each branch heading; trolley wire dead-ended where necessary with proper strain insulators.

Special care, Mr. Conrad said, should be exercised where trolley or feed wires pass through wooden door frames, brattice cloth or other flammable material used in connection with the ventilating system. Trolley-wire ends, he added, should be provided with insulated turnbuckles so that wire can be stretched tight and tension maintained.

"It is particularly important," Mr. Conrad declared, "to be cautious when installing trolley wire or power lines in entries that are inclined to be dry and dusty and where the security of the roof is in doubt. Such entries should be securely supported with steel beams hitched in the ribs where feasible and all flammable materials removed or protected against ignition."

Mr. Conrad called trailing cables at or near the working face "the greatest contributing factors in mine fires" and urged that large coils be eliminated or kept to a minimum by sectionalizing.

The mere fact of installation of protective equipment such as fuses and automatic circuit breakers is not sufficient to prevent mine fires under abnormal conditions, E. J. Gleim, electrical engineer, U. S. Bureau of Mines, Pittsburgh, warned the audience. "For example," he said, "a circuit breaker set to protect a 300-kw. 275-volt generator would carry 1,090 amp. full load, but this load would be too great for a 4/0 trolley wire to carry continuously because the safe continuous load for this size of wire is only 615 amp. There is some question as to whether this circuit breaker would provide adequate protection for the trolley system if the trolley wire broke and fell against the rail."

Mr. Gleim suggested to overcome such a possibility that the generator and the protecting circuit breaker be placed midway along a 4,000-ft. haulageway instead of at one end. As a further step, he advised dividing an entire trolley system into small units or sections, with a circuit breaker to protect each section. Mr. Gleim called this method "protection by isolation," but added: "Unfortunately, fault currents, such as those leaking over trolley insulators, do not come within the scope of this protection. As yet no practical arrangement is available for distinguishing between fault currents and useful currents on a grounded d.c. mine system. If a solution is to be found, here is a problem important enough to challenge the inventive genius of many able engineers in the electrical manufacturing industry."

A. Lee Barrett, maintenance engineer, Pittsburgh Coal Co., Pittsburgh, Pa., said that regular inspection and regular recording of inspection records of both electrical and permissible equipment could prevent many mine fires. He suggested painting and cleaning of insulators at least every year in dusty or damp places, and the regular inspection of cable, with vulcanizing after six to eight hand splices have been made.

"The main thing to remember," he said, "is to maintain flexibility in the finished splice. Remember that no splice is as good as the original cable. However, nothing compares to a good operator. The assistant foreman can help in this regard by seeing that cables are hung up, kept out of water, don't get in the way of other equipment, and that the operator does not permit them to kink." Neoprene cable will burn, Mr. Barrett said, but it will not support combustion. He advised against coiling or piling of combustible cable, because a bad fire could start in a large pile of such cable.

John M. Connor, new institute president

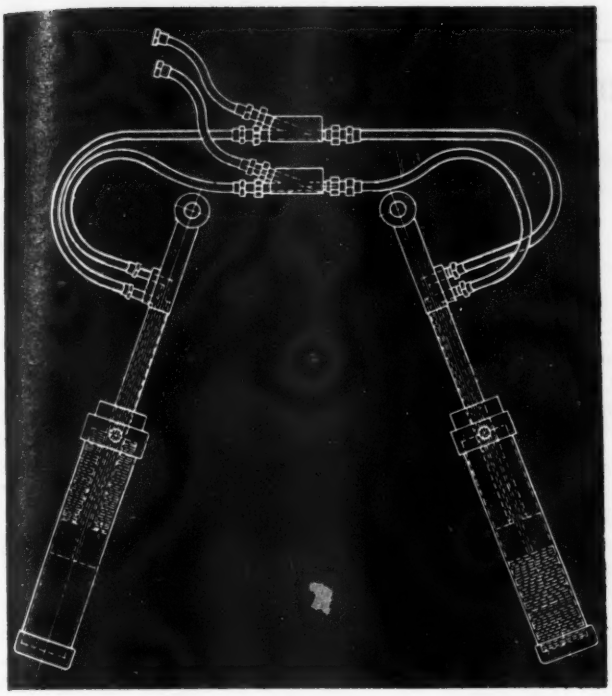
Regular inspection of closed compartments in permissible equipment was another step advocated to prevent fires. A single blow, the speaker said, could make a piece of equipment non-permissible. Dirt, he added, can cause short circuits in such equipment. Accumulations of dirt and grease should be removed regularly from all mining equipment. Closed equipment poorly maintained, he said, can be a worse hazard than open equipment.

Proper and adequate fire-fighting equipment should be readily available in every mine, because the first few minutes of a fire are the most important, G. H. Sambrook, safety director, H. C. Frick Coke Co., Pittsburgh, said, and added that it is too often neglected.

Minimum material for any mine he listed as follows: Six all-service gas masks with extra canisters; six 2½-gal. soda-acid fire extinguishers; 1,000 lineal ft. standard 2½-in. fire hose; 100 80-lb. bags rock dust; two special connections for connecting standard 2½-in. fire hose to 4-in. standard pipe; two connections for 3-in. pipe; two connections for 2-in. pipe; two rolls duck brattice cloth; eight 1-lb. copper hammers; 10 pieces 2-in. standard pipe 5 ft. long, threaded, with one end reduced to ¾ in. and equipped with ¾-in. petcock; 2,000 ft. telephone wire with necessary insulators and installation; one keg 8d. copper nails; one keg 20d. copper nails; one keg 8d. wire nails; one keg 20d. wire nails; 6 hatchets; 6 hand saws; 6 miner's axes; 12 mason's trowels; 5,000 hard burned red brick or concrete block; one mine-type telephone.

In addition, the following material should be delivered promptly to the mine entrance in the event of fire: 40 pieces 2x4 lumber, in lengths from 8 to 16 ft.; 5,000 ft. B. M. brattice boards; 200 sawed wedge-shaped cap pieces. Under desirable equipment Mr. Sambrook listed a self-contained oxygen breathing apparatus and a chemical fire truck of the soda-acid type.

"In the event of fire," Mr. Sambrook said, "the official in charge of that particular territory should take steps to assemble all available close hand equipment and see that it is put to use immediately. At the same time he should have all men in the



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Clarkson Balanced Swinging Device PREVENTS Hitching Breaks!

Just one more of the many labor saving advantages of CLARKSON Loader, is the Patented Swing arrangement, (see description to the left). Added to this feature, is the unfailing performance in digging out 'tight corner shots' *plus* the exclusive advantage of one operator handling *all* controls from one central point—employing only one motor.

Get all the facts about the Clarkson, when giving consideration to Loading equipment.

⇨ Controls and Swings Both Front Head and Rear Conveyor

In operation, one cylinder pushes while the other pulls, creating a balanced load on each side. Then, since each cylinder is of such dimensions as to avoid breaking the hitchings on the pivot end of the pistons, both cylinders work together simultaneously, and ample power is provided to make a smooth, well balanced swinging device.

The
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NASHVILLE—ILLINOIS

(PATENTED)

affected area notified and immediately withdrawn, except those combating the fire. He should then send men to the adjacent sections to obtain any other fire-fighting equipment available."

Procedure to be followed in the case of mine fires was outlined by J. V. Berry, supervisor of safety, compensation and relief, Industrial Collieries Corp., Johnstown, Pa. Actual experience with fires should be preceded, Mr. Berry said, by study of theoretical problems by the foremen under the direction of the superintendent.

This instruction might take the form of having the superintendent place the case of a hypothetical fire before the foremen and having each suggest a method for fighting it. In addition to the study, smoke-room training in formaldehyde fumes should be conducted, and a rescue crew of from 10 to 20 physically qualified men should be formed for each mine.

In the event of fire, Mr. Berry said notification should be given to mine officials, State and U. S. Bureau officials, rescue crews, physicians, nurses, Red Cross and other welfare organizations. The superintendent, outside foreman and supply clerk should see that all mine entrances are roped off and guarded, supplies are on hand, set up an outside headquarters for physicians, nurses and rescue workers, and notify the company that supplies power to the mine.

The electrician and machinist pull all switches entering the mine when told to do so by the superintendent, keep ventilating fan operating if not damaged; or if damaged, repair it, and put in operation when told to do so by proper official. They should also provide for telephone from fan to fire headquarters, from fan to base of operations within mine and from mine to headquarters.

Aluminum checks should be provided for all persons entering the mine, and should be handled by a separate group. A second check group should examine all personnel entering mine for smoking equipment, matches, and examine all lamps and flashlights to see that only permissible equipment is used.

Safety engineers and company inspectors should work out shifts of the personnel, arrange for a man at headquarters at all times to check men in and out, and supervise equipment. The fire chief assembles all fire-fighting equipment, the police allow only authorized persons to enter the area. The store manager provides food, clothing and drinks to the commissary and the commissary manager issues them to authorized personnel. The chief engineer and assistants see that a man is in the office at all times, and provide maps of the mine or area affected.

"It should not be expected," said Mr. Berry, "that the procedure as outlined can cover every detail to follow at a mine fire. Small fires become major ones and sometimes lives are lost or the mine or portions of the mine must be sealed and recovery work is impeded because of the lack of an efficient organization to promptly carry on the work in the early stages."

Introduced by E. A. Holbrook, dean, School of Engineering, University of Pittsburgh, President Charles E. Lawall of West Virginia University spoke on "Trends in Coal Mining Industry" at the annual dinner which was attended by a record 570 persons.

Declaring that there are "too many alarmists" talking about coal, President Lawall predicted a bright future for the industry, and noted three major developments for the postwar era: the advance of mechanization and with it an advance in better preparation, the need for what he termed a sound promotional program, and the need for attracting more young technical experts to the industry. Among mechanical improvements that President Lawall predicted after the war were electronically controlled mining machinery, prefabricated track, and new and better gas detection instruments. President Lawall complimented the industry on instituting a public relations and research program and urged their continued support.

Among guests introduced at the dinner were the heads of the mining departments of three states: Richard Maize, Secretary of Mines, Pennsylvania; J. J. Rutledge, chief engineer, Maryland Bureau of Mines, and Jesse Redyard, chief, West Virginia Department of Mines.

At a meeting held the night before the opening of the institute sessions, Mr. Rutledge was named president of the National Mine Rescue Association. C. M. Donahue, Mine Safety Appliances Co., Pittsburgh, was elected secretary-treasurer, and M. D. Cooper, vice president, Hillman Coal & Coke Co., Pittsburgh, vice president.

Three papers on ventilation, the last being divided into two sections, featured the Friday morning session of the institute.

Mine fans should be stopped once a month and certainly not less often than once every two months and given a thorough inspection, Stephen Krickovic, chief engineer, Koppers Coal Division, Pittsburgh, said in a paper on "Ventilation Techniques Contributing to Safety and Efficiency in Mechanical Coal Mines."

Standby fan units, Mr. Krickovic said, have been generally misunderstood by the industry. He listed four factors as determining the completeness of a standby unit: the gaseousness of the mine, production, wetness and kind of openings. The less gassy the mine, the less need for a standby unit; mines producing less than 1,000 tons daily have less need for production protection; wet mines have greater need for a standby unit to continue operations; and in mines with frequent outcrop openings, standby units are unnecessary.

Mines producing 3,000 tons daily, Mr. Krickovic said, and liberating in active areas 750,000 cu.ft. or more of methane in 24 hours require duplicate ventilating units for safety and continued operation. He placed the minimum cost at $15,000 to $17,000, which, based on a 20-year life, would put the cost per year at less than $1,000.

In gassy mines producing less than 3,000 tons per day, reconditioning of the old centrifugal fan as a standby unit was deemed satisfactory, if a new propellor unit for regular ventilation is installed. In all other mines, except low-producing non-gaseous or mildly gaseous, the centrifugal standby unit is sufficient, and in low producing non-gaseous or mildly gaseous mines, a standy motor for the regular fan should be ample.

To prevent anti-friction bearing failures, Mr. Krickovic suggested the installation of a thermostat on the fan motor.

Ventilation and escapeways by large boreholes was discussed by J. V. McKenna, State mine inspector, Waynesburg, Pa. Most of his data, Mr. McKenna said, had been obtained from experiences in the iron-ore country, where 5½-ft. boreholes have proved practical. However, the largest one in western Pennsylvania is 36 in., Mr. McKenna said.

Two boreholes can be driven for the price of one shaft, the speaker declared, and gave this rough preliminary estimate of cost in the average coal field:

Hole Diameter	Cost per Linear Foot
30-in.	$30-$35
36-in.	35- 40
48-in.	40- 50
60-in.	65- 85

COMING MEETINGS

- **Colorado Society of Engineers: 29th annual convention, Feb. 1-3, Shirley-Savoy Hotel, Denver.**
- **American Mining Congress: annual meeting, Feb. 15, Mayflower Hotel, Washington.**
- **American Institute of Mining and Metallurgical Engineers: annual meeting, Feb. 18-22, Pennsylvania Hotel, New York City.**

COAL AGE was founded in 1911 by the Hill Publishing Co. In 1915 *Colliery Engineer*, with which *Mines and Minerals* previously had been consolidated, was absorbed by COAL AGE.

When, in 1917, the Hill Publishing Co. and the McGraw Publishing Co. were consolidated to form the present McGraw-Hill Publishing Co., COAL AGE became a member of this larger publishing enterprise. On July 1, 1927, the journal was changed from a weekly to a monthly.

During 33 years the editorship has been held successively by Floyd W. Parsons, R. Dawson Hall, C. E. Lesher, John M. Carmody, Sydney A. Hale and Ivan A. Given. The editorial staff of COAL AGE consists of: Ivan A. Given, R. Dawson Hall, Louis C. McCarthy, J. H. Edwards, Fred W. Richart, James R. Sutphen and Ralph R. Richart.

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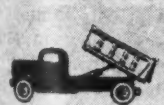
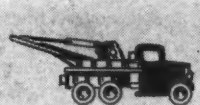
SIX DIVISIONS . . . TO SERVE YOU BETTER THAN EVER BEFORE



HOISTS AND BODIES



WINCHES AND CRANES

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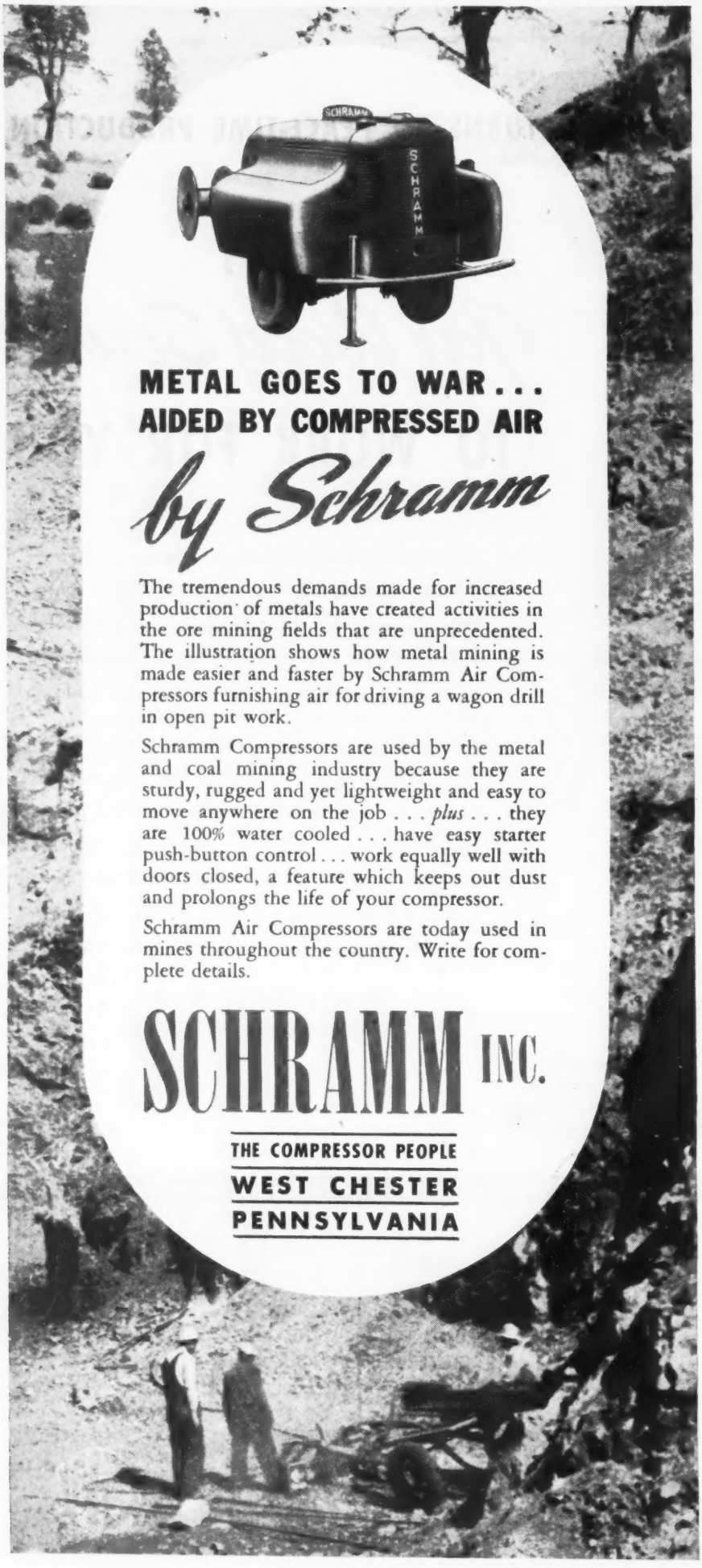
DETROIT 11, MICH. WORLD'S LARGEST MANUFACTURERS OF TRUCK AND TRAILER EQUIPMENT



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AIDED BY COMPRESSED AIR

by Schramm

The tremendous demands made for increased production of metals have created activities in the ore mining fields that are unprecedented. The illustration shows how metal mining is made easier and faster by Schramm Air Compressors furnishing air for driving a wagon drill in open pit work.

Schramm Compressors are used by the metal and coal mining industry because they are sturdy, rugged and yet lightweight and easy to move anywhere on the job . . . *plus* . . . they are 100% water cooled . . . have easy starter push-button control . . . work equally well with doors closed, a feature which keeps out dust and prolongs the life of your compressor.

Schramm Air Compressors are today used in mines throughout the country. Write for complete details.

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1945 OFFICIALS

The following were elected officers of the Coal Mining Institute of America at the Pittsburgh meeting:

President—John M. Connor, West Penn Power Co., Pittsburgh.

Vice Presidents—G. W. Grove, U. S. Bureau of Mines, Pittsburgh; C. A. McDowell, coal division, Jones & Laughlin Steel Corp., Pittsburgh; C. M. Donahue, Mine Safety Appliances Co., Pittsburgh.

Secretary-Treasurer—J. A. Younkins, coal division, Duquesne Light Co., Pittsburgh.

Managing Directors—J. L. Hamilton, coal division, Republic Steel Corp., Uniontown, Pa.; M. L. Coulter, coal division, New York Central R.R., Indiana, Pa.; George Steinheiser, State mine inspector, Uniontown; John L. Sullivan, general superintendent, H. C. Frick Coke Co., Uniontown; R. H. Nicholas, mine inspector, Pittsburgh Coal Co., Library, Pa.

The estimates do not include lining, which Mr. McKenna said would not be required under favorable conditions. Steel ladders could be used as a means of egress by men trapped back of a fire. Many lives can be saved by such a method, the speaker declared.

James Hyslop, vice president in charge of operations, Hanna Coal Co., St. Clairsville, Ohio, said that it was his information that the harder rock formations in the iron-ore country made large-size boreholes more adaptable there than in coal fields. He suggested lining the holes by guniting about 1 in. thick.

The advantages and disadvantages of more than one fan in the event of fire were discussed for the anthracite region by Andrew Wilson and for the bituminous industry by Samuel Cortis, both Pennsylvania State mine inspectors. Mr. Wilson cited as one disadvantage of such an arrangement a fire and explosion near Edwardsville, Pa., in which a series of blasts destroyed the ventilating walls and air bridges and caused the return air currents to become explosive in the upcast shaft and through the fan to the surface.

"Recovery operations," Mr. Wilson related, "were in progress when in some unknown manner the explosive gases in the return became ignited . . . destroying the upcast shaft. Immediately the other fans at another point on the property exerted their influence on the crippled shaft workings, as they were interconnected, with the result that a large percentage of the remaining underground workings became contaminated . . . so that the sealing and recovery operations covered a much larger area.

"If more than one fan is provided at a mine and each fan controls a separate and distinct intake, then there is a decided advantage to the workmen because in such a case it would be practically impossible to

Crush and Sample
One TON *in One* HOUR
with the
STURTEVANT
AUTOMATIC
CRUSHER AND SAMPLER

with 32 fewer operations

Here is the modern way—the quicker way—to process coal for the laboratory to meet the increasingly specific demands for a better quality coal to meet the increasingly SPECIFIC requirements of modern plants. The FIRST STEP in laboratory-control of coal QUALITY is to get accurate samples quickly and at low cost. This the Sturtevant Coal Crusher and Sampler does without hand labor. Proven by the test of actual service in modern collieries. Can be depended upon as reliable equipment. Simple, rugged, easily adjusted and maintained — and ACCURATE. The ideal combination with this Sampler is the STURTEVANT FINE GRINDER.

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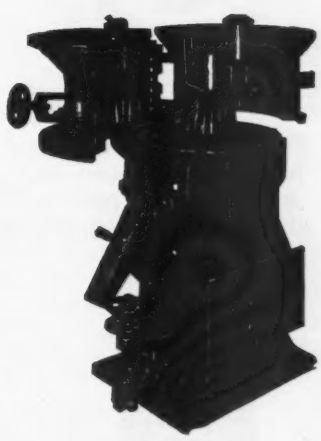
The Sample Grinder is of the "open-door" disc design, producing products as fine as 100 mesh (coarser, if desired) working on dry, friable, soft or moderately hard materials. Hand-wheel regulates output from 10 to 100 mesh. Will handle hard rock and ore at reduced capacities. Full description and price on request.



BULLETIN 85

Illustrates and describes the above machine in detail. We will also be glad to advise you regarding its specific advantages on your individual work, if you will write us stating your problems or conditions.

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MODERN MINING

45° Dump Cage

Four point setting. In designing Holmes' all-steel cages, first consideration is given to proper distribution of the load, so that the weight is transmitted directly to the lower bail members.

Bicycle Type Sheave Wheels

A light weight wheel, yet of strong section to avoid undue bearing wear and high inertia. Renewable liners, with bolts locked against turning or coming loose. Sizes, three feet to twelve feet in diameter.

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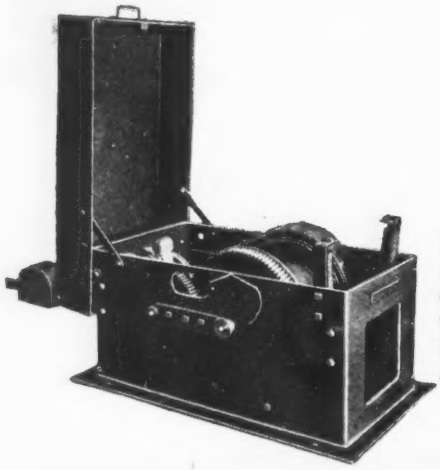
Fabricated welded steel plates. Gate quadrant balanced on steel pins. May be operated by pull rod or cables. Suitable for bottom discharge bins.



Electric Car Retarder

Designed to offer complete control over movement of cars under loading booms or chutes at tipple, without the use of sprags, brake, or other time wasting operations.

ROBERT HOLMES AND BROS.

BINS - GATES - LOWERING SPIRALS - DUST-O-LATORS - SHAKING GATES

DANVILLE, ILLINOIS

find a location in the mine at which a fire could be started which could endanger the workmen in any part of the mine excepting in the particular split in which the fire occurs, provided, of course, a change is not made in the physical layout of the mine."

Mr. Cortis said that it was his opinion that where two or more fans are arranged in series, the disadvantages outweigh the advantages, but where they are arranged in parallel, the advantages greatly outweigh the disadvantages. Fans arranged in series he described as one fan discharging its volume of air into the intake of the other fan. They may be either close or some distance apart. Fans are in parallel when the air from one fan does not pass through the other fan, but is discharged into the common airway or directly into the outside atmosphere.

Mr. Hyslop and John Provost, superintendent, Harwick mine, Duquesne Light Co., Harwick, Pa., shared the subject of efficient main-line haulage systems.

Opening his paper, Mr. Hyslop pointed out that in a survey of ten mines of three companies, cents per ton-mile for main-line haulage varied all the way from 1.4 to

COAL ACTIVITY

Bituminous Coal Stocks

Thousands

	Net Tons Nov. 1, 1944	P.c. Change From Oct. 1, 1944	P.c. Change From Nov. 1, 1943
Electric power utilities	17,962	+1.1	+1.4
Byproduct coke ovens	6,397	+3.6	−3.9
Steel and rolling mills	797	+0.8	−0.7
Railroads (Class I)	14,691	−0.6	+16.9
Other industrials	19,410	−1.2	−24.7
Total	59,259	+0.2	−6.9

Bituminous Coal Consumption

Thousands

	Net Tons Oct. 1944	P.c. Change From Sept. 1944	P.c. Change From Oct. 1943
Electric power utilities	6,752	+1.4	−7.7
Byproduct coke ovens	7,985	+5.0	+3.6
Steel and rolling mills	865	+7.2	−8.2
Railroads (Class I)	10,993	+8.3	−1.9
Other industrials	12,455	−6.6	−6.7
Total	38,990	+8.4	−3.6

Bituminous Production

November, 1944, net tons	50,215,000
P.c. change from Nov., 1943	+12.5
January–November, 1944, net tons	574,160,000 *
P.c. change from Jan.–Nov., 1943	+6.5

Anthracite Production

November, 1944, net tons	5,073,000
P.c. change from Nov., 1943	+22.5
January–November, 1944, net tons	59,860,000
P.c. change from Jan.–Nov., 1943	+7.6

Sales, Domestic Stokers Vs. Oil Burners

	Stokers	Burners
October, 1944	4,963	3,957
P.c. change from Oct., 1943	+78.2	+263.0
January–October, 1944	28,747	25,374
P.c. change from Jan.–Oct., 1943	+29.9	+83.2

Index of Business Activity *

Week ended Dec. 23	230.7
Month earlier	230.7
Year earlier	236.3

**Business Week*, Dec. 30.

Electric Power Output †

Week ended Dec. 23, kw.-hr.	4,616,975,000
P.c. change from month earlier	+5.7
P.c. change from year earlier	....

†Edison Electric Institute

Latest DEVELOPMENT IN SYNTHETIC CONSTRUCTION FOR *Coal Conveyors*

WHERE operating conditions are severe, for room conveyors, mother belts, slope conveyors, cleaning plant and refuse conveyors, install Super Excelo Reprene belts for long, economical service. Improved with special oil-and-heat-resisting synthetic rubber, they now represent the highest development in synthetic construction. These scientific rubber compounds, combined with a carcass of heavy, pre-stretched duck, provide great strength, flexibility, low stretch, fatigue resistance, bonding against ply separation, and trouble-free service. The covers are highly resistant to abrasion, cutting, tearing, oil and heat. Super Excelo Reprene belts are engineered and built for specific services, with weight of fabric, number of plies, breaker strips and thickness of covers dependent on load requirements and types of application. Ask your nearby Republic Distributor about Super Excelo Reprene belts for your tougher conveyor jobs.

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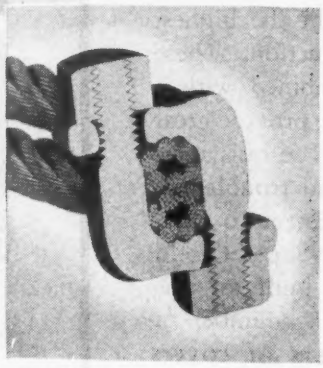
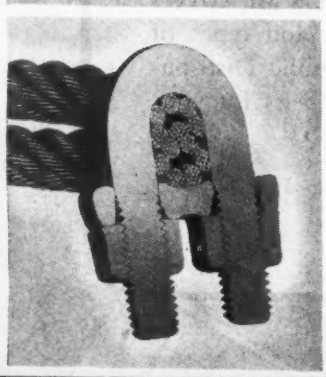
RIGHT AND WRONG WAY TO HOLD WIRE ROPE

Examine these cross-section views of a "Fist-Grip" Safety Clip and "Finger-Pinch" U-bolt. (Each tightened to exactly the same tension with a torque-indicating wrench). Notice how the "Fist-Grip" clip holds the rope evenly with only the slightest flattening . . . how the U-bolt crushes the rope out of shape as evidenced by the distorted hemp center under the "U".





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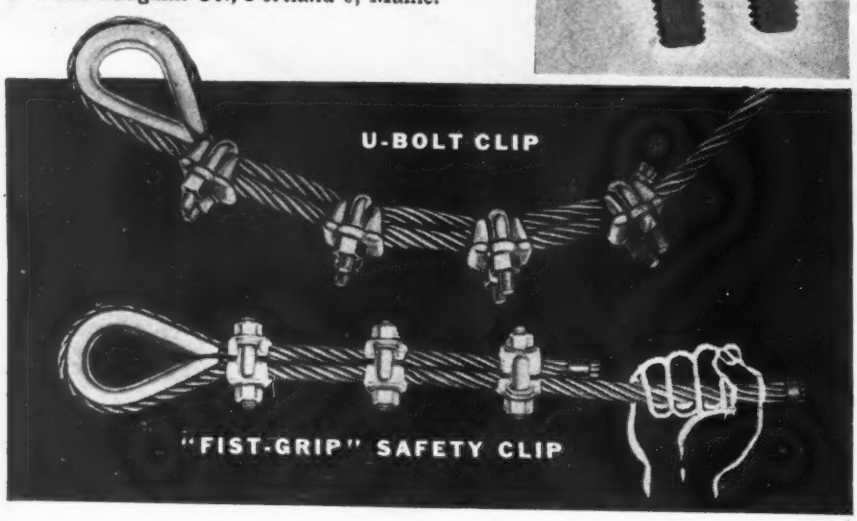


LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS

14.8. He said efficient main-line haulage had three major objectives: to operate at low cost per ton-mile as well as low over-all cost; to operate on a schedule that will have empty mine cars available at the proper places at the right time; and to work the maximum possible acreage from one shaft or tipple site.

He listed ten factors which could contribute to inefficient haulage operations: locomotives too small; lack of proper inspection and maintenance of locomotives; insufficient cars or cars too small; inadequate maintenance and inspection of cars; insufficient or poorly located passways; poor track; insufficient power or substations too far from working places; lack of system in location of production sections; poor roof; and poor dispatching and signaling.

There are three choices of main-line haulage locomotives, Mr. Hyslop said, and each is best for certain uses. They are the conventional type, a tandem hookup with two conventional type locomotives, and the single 8-wheel type.

"Mine cars," he said, "are now two to three times the capacity they used to be and are the same weight. This permits use of fewer cars, decreases maintenance costs and simplifies dispatching and sidetrack and passway requirements. More coal can be hauled by large cars with the same power."

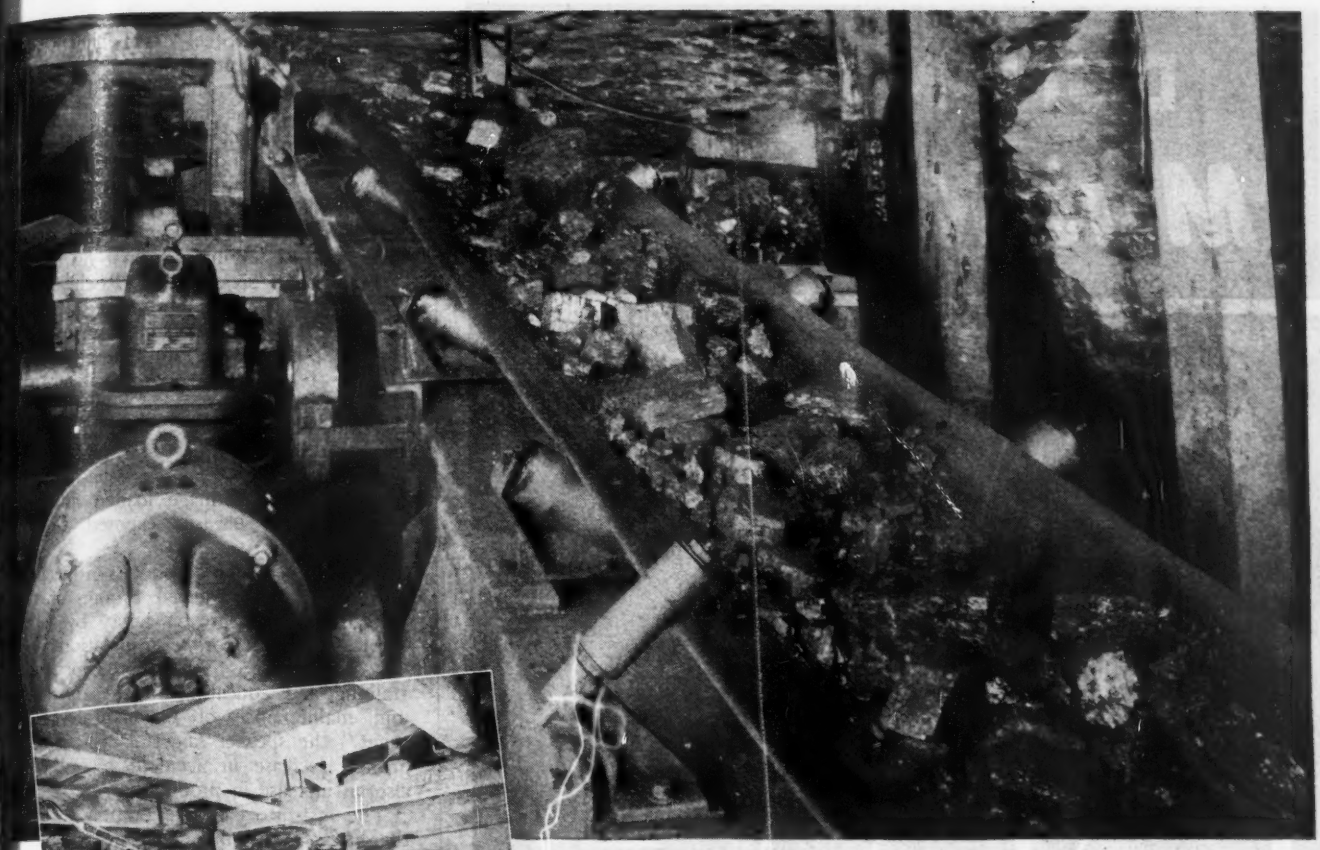
Grease lends itself to helping create a dust and dirt seal on haulage equipment and is to be preferred to oil, he said; which has not been found practical.

Proper track, Mr. Provost said, is an important factor in efficient main-line haulage. Insufficient rail weight; rotted, insufficient or small crossties; poor bottom and water seepage under road bed can all contribute to bad track.

"Dispatching of trips is very important," the speaker said. "A good telephone system supplemented by a system of automatic signal blocks is necessary to accomplish smooth and efficient operation. Wherever practical, double track is desirable, but where single track is used, a sufficient number of passageways should be provided to facilitate the movement of trips into and out of the mine."

Lighting with 50-watt lamps at 150-ft. intervals on the main haulageway has been found satisfactory, he said. Adequate, well-lubricated trolley wire; sufficient power, and good roof support were other factors which Mr. Provost said would contribute to efficient operation of the haulage system.

The meeting closed with a panel discussion of the topic "Is Mechanical Loading Safer Than Hand Loading?" Of the four speakers, R. H. Nicholas, mine inspector, Pittsburgh Coal Co., was the only one to defend hand loading as a safer operation. He said that in mechanical loading, the more rapid advance liberated more gas; the handling of greater quantities of coal threw more coal dust into suspension in the air; mechanical equipment was near the face and presented a hazard; large roof areas were supported by temporary timbering while loading out; larger quantities of explosives were concentrated in small sections; and faster retreat created a hazard for men inspecting pillars.



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HOMOCORD and other MANHATTAN CONVEYOR BELTS . . . give you greater tonnage and longer life in underground workings

Homocord Conveyor Belt

Engineered Homocord Strength Members grouped to give great tension strength are sealed-in with moisture-proof FLEXLASTICS* and mildew-proofed to provide added protection from dampness in mine-workings, cushion feeding impact, reduce hazards of puncture, increase flexibility for perfect troughing, and decrease inelastic stretch. Homocord is the first and only conveyor belt possessing the virtues of a cord belt, but with the strength and ability to hold metal fasteners. Tough wear-resisting cover provides protection from abrasion and puncture.

Other MANHATTAN Conveyor Belts for underground service . . . Made with FLEXLASTICS* and specially designed Strength Members to distribute load strains uniformly. Longitudinal and transverse flexibility provides power-economy, traction and easy troughing. Compensated to equalize ply-stresses over small pulleys.

All MANHATTAN Conveyor Belts are mildew-proofed for underground service, and are oil-proofed where needed.

ADVANTAGES of HOMOCORD CONVEYOR BELTS

1. Complete bonding of every member into a homogeneous structure.
2. Holds metal fasteners.
3. Lateral flexibility permits perfect troughing, accurate training, reduces fatigue of flexing at bend in troughing idlers.
4. Resists destructive action of continuous or heavy impact feeding.
5. Cushion Homocord body and low inelastic stretch reduce wear and tear of top cover.
6. Homocord body reduces hazard of punctures.
7. Homocords so completely encased in Flexlastics, moisture not admitted, mildew cannot start.
8. Longer life, lower cost per ton.

The term FLEXLASTICS is an exclusive MANHATTAN trade mark. Only MANHATTAN can make FLEXLASTICS.

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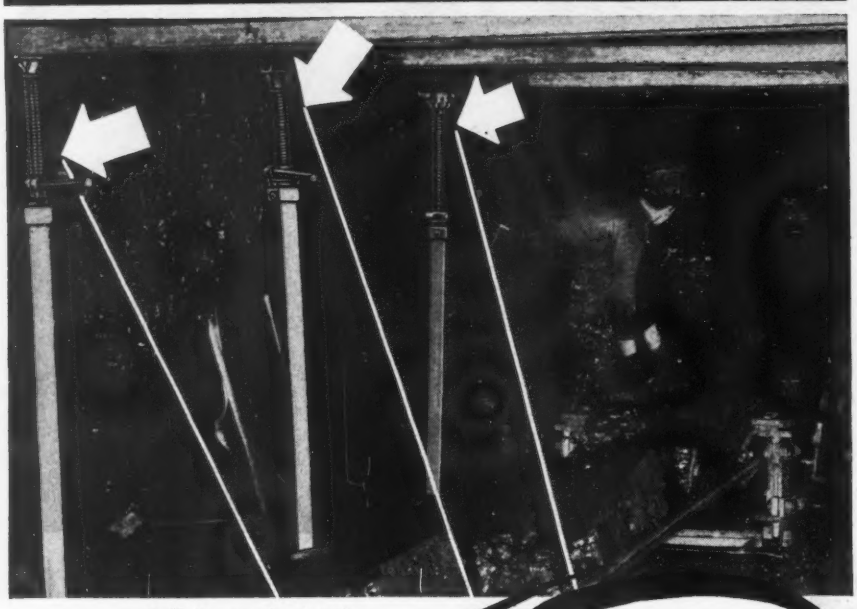
MINING JACKS



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"MECHANICAL MUSCLES" ...A JACK FOR EVERY JOB!

The features you want in the Jacks you use are built into every Duff-Norton Jack—strength, simplicity, ease of operation, long life—the result of over 60 years' specialized experience in Jack design and manufacture.

For every job in and around the mine, there's a Duff-Norton Jack . . . ready to provide "mechanical muscles" on every job of lifting, holding, lowering, pushing and pulling. Write for Catalog 202.

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J. L. Hamilton, manager, Northern Coal Mines, Republic Steel Corp., Uniontown, Pa., said high production rates reduce man-hour exposure; direct exposure to roof conditions at the face is generally less; speed of coal recovery lends itself to an improved roof condition on pillar sections, through both timbering and weight distribution. He said that both frequency and severity accident figures showed mechanical loading to be less hazardous at his mines.

Figures at six selected Rochester & Pittsburgh Coal Co. mines, three mechanized and three hand-loading, were given by W. D. Northover, safety director. They showed fewer total accidents and less frequency in the mechanical mines than in the hand-loading ones. Two main factors made mechanical mines safer, Mr. Northover said. They were less man-hour exposure for the tonnage loaded and less area involving hazards exposed to the workers.

Closer supervision of workers in mechanical mines was advanced as one of the reasons for their greater safety by J. H. Zorn, safety director, Consolidation Coal Co., Renton, Pa. "With more experience, training and education in the operation and maintenance of mechanical equipment," the speaker said, "it will show a greater decrease in accident records and also an increase in production."

The institute passed a motion to have the heads of mining departments in the several states require that cable be fire-resistant.

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Personal Notes

JOHN RAYMOND, general foreman for the Utilities Elkhorn Coal Co., Pineville, Ky., has been promoted to superintendent of the Esco mine, succeeding A. O. Coleman.

JOHN W. CRAWFORD, secretary-treasurer of the DeBardeleben Coal Corp., Birmingham, Ala., has been elected to membership in the Controllers Institute of America.

GEORGE B. MCKIBBIN, director of the State Department of Finance of Illinois, has been appointed State Coal Conservator by Governor Green.

JOHN E. SHEPPARD, Covington member of the Kentucky Workmen's Compensation Board, has been named chairman, vice Pearl H. Hyden, resigned.

JAMES R. WALTHOUR, Irwin, has been reappointed as inspector of the 19th bituminous district in Westmoreland County for the Pennsylvania Department of Mines.

OLEN S. E. CONRAD, California, has been renamed as inspector of the Ninth bituminous district, in Washington County, for the Pennsylvania Department of Mines.

JAMES W. TYSON 2D has been elected vice president of Eastern Gas & Fuel Associates, with headquarters in Pittsburgh. He joined the Koppers Co. in 1929, becoming in 1934 assistant treasurer of Koppers Coal Co., later Koppers Coal Div. of Eastern Gas & Fuel Associates.

FRED K. PROSSER, coal traffic manager of the Norfolk & Western Ry., now on leave of absence with the Solid Fuels Ad-

Light in Weight but Heavy in *Quality*

AMES Since 1774

Wyoming RED EDGE RIVETLESS SOCKET

WIDE GRIP
Full wood grip securely riveted to forks and armored caps.

CLIPS
Patented rivet clips lock the grip to sides of handle.

STEEL CAPS
The forks of the handle are reenforced by steel caps securely fastened to grip and forks. Top of cap is fitted over end of grip.

DIE-PRESSED LABEL

BALANCE AND WEIGHT
This new Red Edge is a better balanced tool. It is lighter, trimmer and yet tougher than ever.

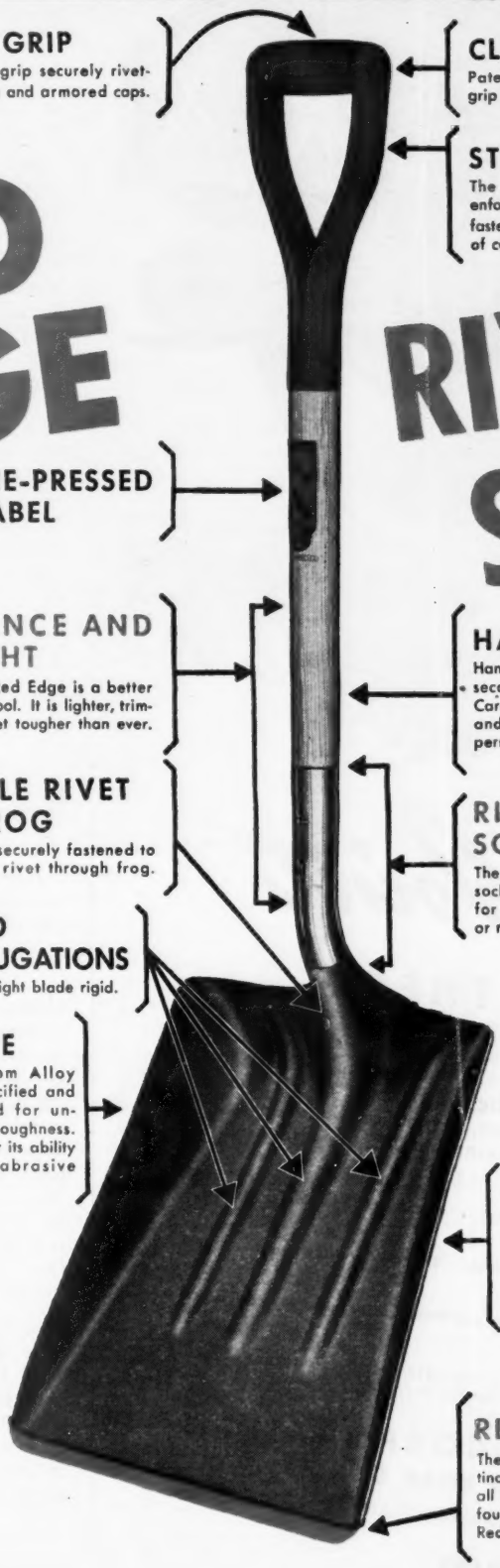
HANDLES
Handles are manufactured from second growth Northern Ash. Carefully sanded, highly waxed and polished. Rivetless socket permits easy rehandling.

SINGLE RIVET IN FROG
Handle is securely fastened to shovel by rivet through frog.

RIVETLESS SOCKET
The elimination of rivets in the socket gives a smooth surface for sliding of hand. No sharp or rough edges.

RIBBED CORRUGATIONS
Make the light blade rigid.

BLADE
Made from Alloy Steel specified and approved for unequaled toughness. Famous for its ability to resist abrasive wear.



HEAT TREATED
Blade is heat treated by electrically controlled furnaces giving just that right amount of hardness and ductility.

FEATHERWEIGHT COAL SHOVELS

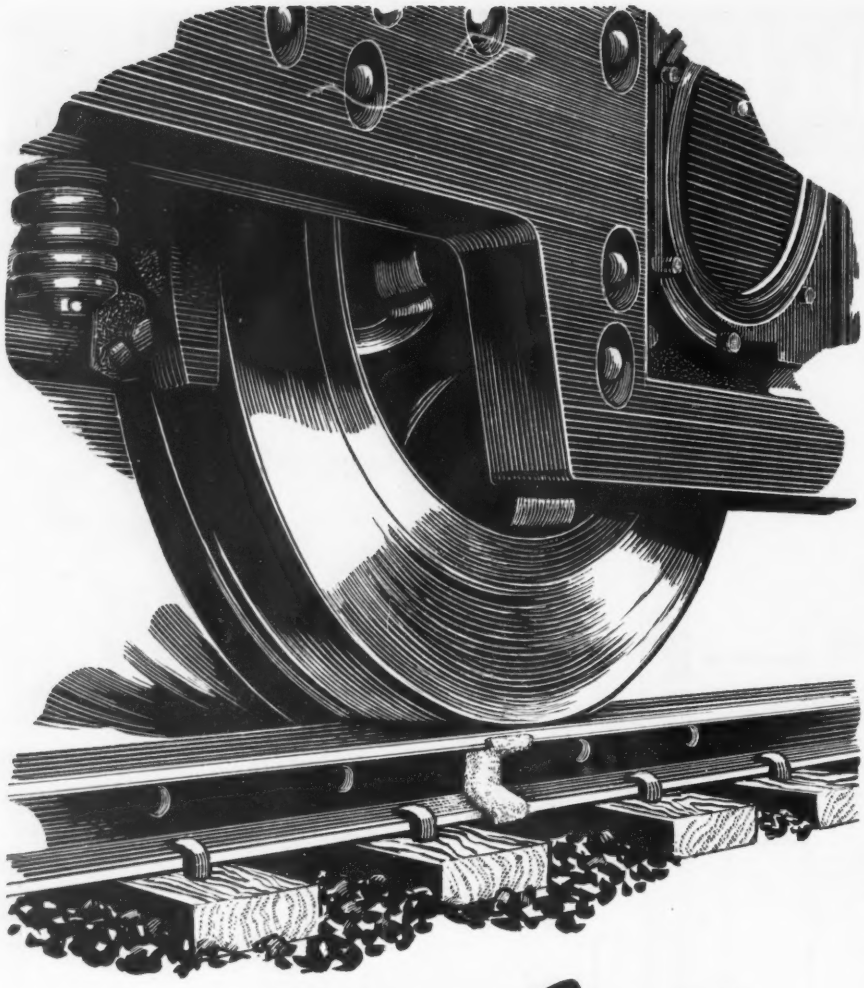
RED EDGE
The painted red edge is a distinctive mark of identification on all Red Edge Shovels. It is only found on the genuine Wyoming Red Edge.

ARMY E NAVY

PARKERSBURG, W. VA. **AMES BALDWIN WYOMING CO.** NORTH EASTON, MASS.

"AMES PRODUCTS"

SHOVELS • SPADES • SCOOPS • FORKS • HOES • RAKES • POST HOLE DIGGERS



The Rail Joint

THAT ISN'T THERE

A Thermit welded joint isn't a joint at all! For when the rails are welded into a continuous stretch, the weld becomes a permanent, integral part of the rail itself. Since the major part of all track maintenance work occurs at the joints, Thermit Welding not only eliminates the need for joint maintenance, but gives you these other important advantages:

LOWER POWER CONSUMPTION . . . conductivity is approximately 20% greater than bonded track and remains constant.

HIGHER OPERATING SPEEDS WITH LESS SPILLAGE...Thermit welded track holds its line and surface better.

LONGER RAIL LIFE...Thermit welding eliminates end batter, also reduces wear and tear on ties and rolling stock.

Thermit welding can be done by your own crew after instruction by a Metal and Thermit supervisor. Write for full details.

METAL & THERMIT CORPORATION
120 BROADWAY, NEW YORK 5, N. Y.
ALBANY · CHICAGO · PITTSBURGH · SO. SAN FRANCISCO · TORONTO

THERMIT *Welding*

ministration for War, has been sent on a one-man mission to North Africa and other Mediterranean countries to make a survey of the coal requirements of those regions, the present state of their available supply other than shipments for the United States and, with respect to the latter, to ascertain how far it may be possible to utilize low-grade coals from this country because of the stringency here in the available supply of high-grade coals. He expects to be away about six weeks.

EDWIN H. JOHNSON has severed his connection with the Jeffrey Mfg. Co., Columbus, Ohio, with which he has been associated for the last nine years as a mining engineer in the mining sales division, to become chief engineer of mines for the Republic Steel Corp., a newly created position. His work will be in connection with the company's coal and iron-ore mines in the Lake Superior district, northern New York State, western Pennsylvania, Kentucky and Alabama. His headquarters will be in Cleveland, Ohio. Upon his graduation from Carnegie Institute of Technology, where he received B.S. and M.S. degrees, he served two years as a coal miner, followed by a year in fellowship work with the U. S. Bureau of Mines. In 1926 he joined the Coloder Co. as sales manager and two years later went to the Cardox Corp. in the same capacity, later becoming general manager and vice president. Six years later he became a division manager of the Sullivan Machinery Co. and in 1935 joined Jeffrey.

RICHARD MAIZE, State Secretary of Mines of Pennsylvania, has been named by Governor Edward Martin as State Director of Coal Conservation.

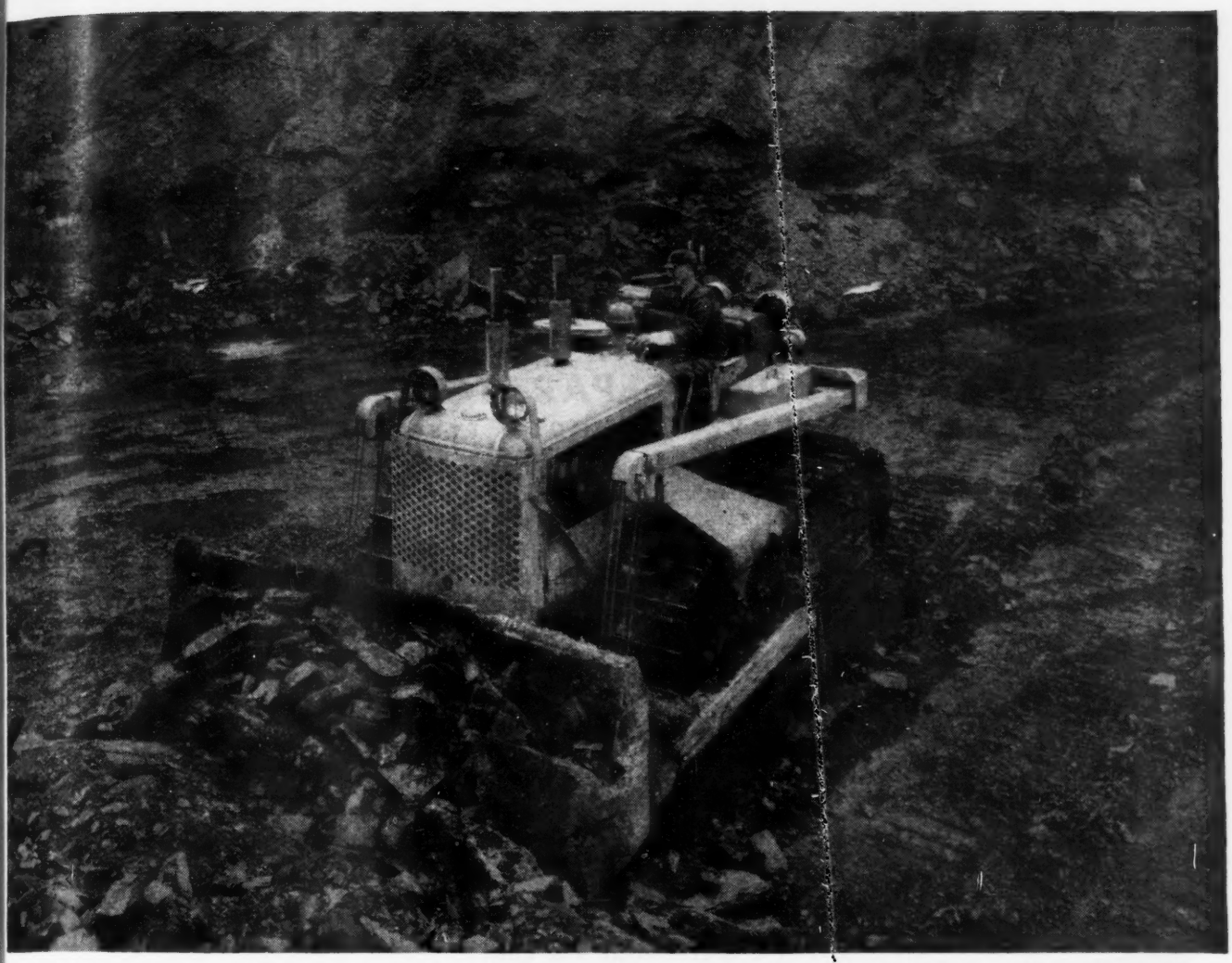
HUBERT H. WALL, Elkhorn, has been appointed mine inspector for District 27 (McDowell County), West Virginia.

LESLIE E. SAWYER, previously forester for the U. S. Soil Conservation Service, Milwaukee, Wis., has been engaged as forester by the Indiana Coal Producers' Association, which is engaged in an extensive program of reforesting the stripped coal lands of the companies composing its membership. Mr. Sawyer was graduated from Michigan State College in 1924 and prior to his appointment as forester for the soil service served as associate professor of forestry in the University of Georgia, as a member of the Florida State Forestry Department and as an extension forester in Illinois.

ROBERT F. DUEMLER has resigned as chief of the Anthracite Division of the Solid Fuels Administration, effective Dec. 31. He leaves to become vice president of the Delaware, Lackawanna & Western Coal Co., New York, of which he was assistant to the president in August, 1943, when he left to join SFA.

Obituary

WILLIAM GARNETT WILLIAMSON, 72, general manager of the Peerless Coal & Coke Co., Vivian, W. Va., died Dec. 14 of a heart attack at his home in Vivian. He also was a director and treasurer of the Peerless-Darby Coal Co., Splint, Ky.



'Dozing slate from a 30-inch seam into loading piles with an International TD-18 Diesel TracTracTor. This outfit, owned by the Crowe Coal Company, is operating in a large strip mining area near Clinton, Mo.

Reduce Your Stripping Costs with INTERNATIONAL POWER

International TracTracTors, with equipment to fit the job, are proving their efficiency in stripping both light and heavy overburden.

This is only one of many ways in which these versatile crawlers fill the bill in the coal mining industry. Equipped with 'dozer and grader blades, shovels, loaders, etc., they clear mine sites, build and maintain haul roads, move and level spoil banks, handle waste, level tipple sites, stockpile coal, and dig drainage ditches.

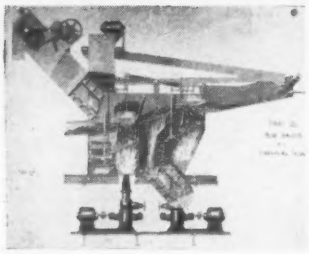
Investigate the many applications of this dependable, all-around power for your operations. See the International Industrial Power Distributor. He is in a position to help you get the most out of your present equipment.

HARVESTER

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

INTERNATIONAL ENGINES
Power for Victory . . . Power for Peace

PRODUCE *Better Coal* AT LOWER COST . . . WITH R and S MODERN EQUIPMENT

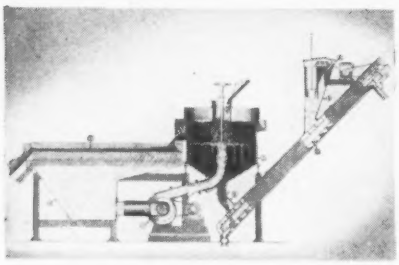


For all coarse coal washing

✔ HYDRO-SEPARATOR

IMPROVED LAUNDER TYPE

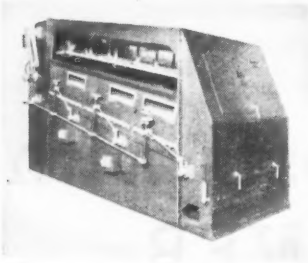
A product of painstaking engineering and long, intimate knowledge of production problems, the Hydro-Separator is known wherever coal is mined, as an exceptionally well built, efficient unit.



For low cost washing of fine coal . . .

✔ The HYDROTATOR

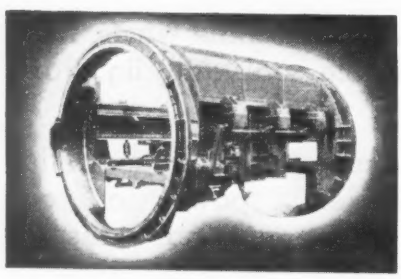
This is the effective way to wash fine coal and get increased recovery of marketable coal from sludge and refuse. Low cost efficiency is built into the Hydrotator.



For dry cleaning fine coal

✔ STUMP AIR-FLOW

Experienced operators *know* Stump Air-Flow—know it for its simplicity and dependability, for its sturdy construction. It cleans, dries, dedusts in one operation.



Handles any size and type of car

✔ ROTARY CAR DUMPER

Faster dumping, easy handling, unique safety features, reduced labor cost and minimum degradation—these advantages make the R and S Car Dumper the outstanding leader, Electric and Pneumatic types.

Bulletins describing these well designed, dependable units are modern "must" literature. Sending for them is a wise step—no obligation, of course. Simply refer to the product name.

R AND S COMPANY

ROBERTS and SCHAEFER CO.

307 North Michigan Avenue, Chicago

P. O. Box 865
PITTSBURGH, PA.

P. O. Box 570
HUNTINGTON, W. VA.

Start Safety Program In Drumheller Field

Seeking to better mine safety records in the Drumheller (Alta.) field, the Drumheller Coal Operators' Association announced Nov. 23 that a safety campaign would be launched Dec. 1 offering prizes totaling $2,000 to workers in twelve mines in the area. The contest comprises two six-month competitions, the first beginning Dec. 1 and ending May 31, 1945, with $1,000 in prizes being offered in each period.

The association has appointed an accident prevention committee consisting of H. H. McVeigh, general manager, Murray Collieries (chairman); H. W. Clark, manager, Commander mine; T. Smith, manager, Monarch Coal Mining Co., Ltd., and V. A. Cooney, secretary of the association. Mine managers are to choose four of their number to act as an advisory body, and the mine manager at each mine shall be chairman of the mine safety committee, which shall also include a fireboss, pit boss, miner, machine man, haulageman and surface man.

Equipment Approval

One approval of permissible equipment was issued by the U. S. Bureau of Mines in November, as follows: Koehler Mfg. Co.—Wheat animal lamp, in either G.W. or G.Q. model; Approval 1023; Nov. 13.

Preparation Facilities

Leckie Smokeless Coal Co., Anjean, W. Va.—Contract closed with Kanawha Mfg. Co. for Kanawha-Belknap washing plant to handle 50 t.p.h. of egg coal, complete with necessary conveying and screening units.

New River Co., Mt. Hope, W. Va.; Mill Creek, Fayette County, W. Va.—Contract closed with Kanawha Mfg. Co. for equipment at new mine to produce both strip and deep-mined coal at rate of 300 t.p.h., layout consisting of 500-ton coal bin and 300-ton rock bin for drop-bottom cars; 535-ft. belt conveyor line to six-track tipple, preliminary shaker screens, three Allis-Chalmers Ripl-Flo vibrators, 72-in. Jeffrey Baum jig to wash 6x⅜-in. coal at rate of 200 t.p.h., dewatering and sizing shaker screens, settling tank, middlings crushing and recirculating system, and loading booms on five tracks; sizes to be shipped are lump, egg, stove, nut, pea and slack, with cracking, blending and reassembling features incorporated.

Bell Colliery Co., Scranton, Pa.—Contract closed with Deister Concentrator Co. for one No. 7 SuperDuty diagonal-deck washing table to treat barley coal.

Necho Coal Co., Tremont, Pa.—Contract closed with Deister Concentrator Co. for six No. 7 SuperDuty diagonal-deck washing tables to clean pea, No. 1 buckwheat and rice coals.

Phoenix Coal Co., Llewellyn, Pa.—Contract closed with Deister Machine Co.

If you remove the cover of a FARREL GEAR UNIT...

. . . YOU FIND that the gears are of the continuous tooth herringbone design — *The Gear with a Backbone* —precision generated by the famous Farrel-Sykes process. Among the advantages of these gears are:

1. *Extra strength and high load-carrying capacity in small space.* There is no center groove between the two helices, which means that the entire face width is put to work.

2. *Smooth, quiet operation.* The result of interlacing of the teeth, gradual engagement and inclined line of pressure.

3. *Long, trouble-free service.* Oblique lines of contact and evenly distributed pressure eliminate any tendency of teeth to wear unevenly, and maintain correct tooth action throughout the life of the gears.

Farrel Gear Units are available for a wide range of applications and service conditions. For further information, write for a copy of Catalog 438.

FARREL-BIRMINGHAM COMPANY, INC.

ANSONIA, CONN. • BUFFALO, N. Y.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y. -- Branch Offices: New York, Pittsburgh, Akron, Los Angeles

FARREL

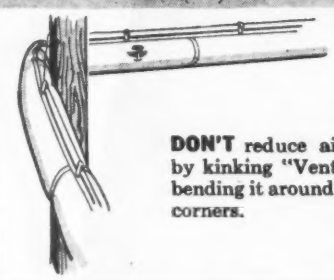
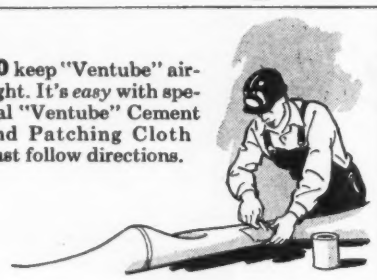
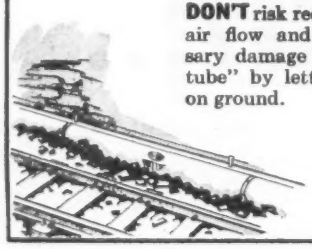
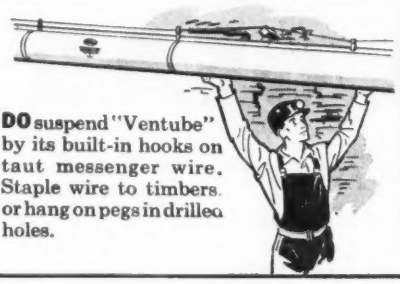
The Gear with the Backbone

AVOID THESE COMMON MISTAKES IN USING TUBING

For efficiency and safety, use "Ventube"* right!

Properly used, blowers and tubing are important assets in many mines today. They carry adequate quantities of clean air up to the dead ends of entries and rooms where the main current would never go unaided, bringing much-needed oxygen to hard-working men. After a blast, they clear the face, reduce waiting time and add productive minutes to every shift.

But improperly used, blowers and tubing — like most other mine equipment —may be inefficient and unsafe. Practical experience shows these *wrong* and *right* ways to use blowers and Du Pont "Ventube."

WRONG	RIGHT
 **DON'T** reduce air-flow by kinking "Ventube," bending it around sharp corners.	**DO** get full flexibility and efficiency . . . turn sharp corners with proper "Ventube" fittings. And build good tubing patterns easily with T, Y and Reducer units.
DON'T lose air velocity by letting leaks and breaks go unfixed. Even "Ventube" is sometimes punctured or torn.	 **DO** keep "Ventube" airtight. It's *easy* with special "Ventube" Cement and Patching Cloth Just follow directions.
 **DON'T** risk reduction of air flow and unnecessary damage to "Ventube" by letting it lie on ground.	 **DO** suspend "Ventube" by its built-in hooks on taut messenger wire. Staple wire to timbers or hang on pegs in drilled holes.

Du Pont "Ventube" is flexible tubing, sturdy fabric impregnated and coated with a special abrasion-resistant compound. It resists heat, moisture, mildew, dry-rot, acid and alkaline waters. It is easily carried and stored.

Properly suspended, free of sharp bends, and attached to a fan with adequate capacity and with permissible motor, "Ventube" flushes the face with fresh air . . . helps remove dust and bad air from any space a man can enter . . speeds the production cycle . . . promotes health and steady efficiency of workers . . . is a vital part of the nation's war production effort. Use "Ventube" . . and when you do, use it *right*. E. I. du Pont de Nemours & Co. (Inc.), "Fabrikoid" Division, Fairfield, Connecticut.

NOTE: War Production Board regulations permit us to supply "Ventube" for all mining purposes. To expedite delivery, it urged that you furnish us with complete priority information on your orders.

DU PONT "VENTUBE"

*"VENTUBE" *is Du Pont's registered trade mark for its flexible, rubberized ventilating duct.*

DU PONT

BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY

for Deister Plat-O washing table to treat No. 1 buckwheat; normal rated capacity, 15 tons of feed per hour; addition to existing facilities.

•

Keystone Cave Bill Revival Urged

Reintroduction of the Kohler-Fowler mine-cave bill in the Pennsylvania Assembly early in 1945 was recommended at a Tri-County Cave Protective Association meeting Dec. 17 in the Borough Building, Forty Fort, Pa. The newly created organization, embracing Luzerne, Lackawanna and Schuylkill counties, elected Willard Shortz, former State Representative, as chairman and Benjamin Evans, secretary, with a permanent organization to be formed later.

The sentiment of the meeting, which included about 50 persons, among them borough and city officials as well as members of the General Assembly, was that the Kohler-Fowler bill, which was declared unconstitutional by the U. S. Supreme Court 25 years ago, now stands a good chance of being approved by a more liberal high court.

•

Pocahontas Operators Hold Lighting Clinic

The Appalachian Electric Power Co., in cooperation with the Pocahontas Operators' Association, held a "lighting clinc" with particular reference to tipple lighting at Bluefield, W. Va., on Saturday, Dec. 9. Sponsored by J. P. Gills, of Appalachian, and W. E. E. Koepler, association secretary, the meeting was attended by 48 representatives from the various mining companies in the Pocahontas field. These men were generally operators, superintendents, engineers, preparation specialists, sales representatives and power company engineers.

After a luncheon, at which the Appalachian Electric Power Co. was the host, the meeting was addressed by G. L. Furr, division manager; Mr. Gills, assistant division manager; Julius Hall Jr., power engineer; and J. C. Smith Jr., illuminating engineer, all of Appalachian; E. D. Altree, illuminating engineer, General Electric Co.; and W. E. McQuail, Turkey Gap Coal & Coke Co., chairman, safety committee, Pocahontas Operators' Association, who also presided as chairman of the meeting.

Mr. Gills outlined briefly the purpose of the meeting. In the preparation of coal for the market the final inspection before loading into railroad cars is a visual task comparable to an inspection job in other industries, performed in most instances by men who are incapacitated for more strenuous jobs. It has been found that these men sometimes are deficient in their ability to see. In many cases the light under which they are attempting to do a visual job is not the proper light for quick perception of the impurities in the coal. The Appalachian Electric Power Co. has a continuing interest in the welfare and progress of the mining companies it serves.

What makes BOWDIL the best Coal Cutting Equipment?

BOWDIL'S reputation as a manufacturer of the finest coal cutting equipment is built on:

1. **Knowing the needs of our market—and designing equipment to meet those needs!**
2. **The maintenance of high quality standards, both in material used and in our methods of manufacture. Only specially selected metal is used and tolerances are rigidly controlled.**

Take for example the BOWDIL Bit and Chain combination illustrated here. The design of this unit is based on first-hand knowledge of coal cutting problems—and the bit and chain were subjected to exacting field tests for 15 months before we introduced them on the market! The couplings are designed for quick, easy removal and remounting, thus saving man-hours and reducing maintenance time. Connections are large and positive and, of real importance, the chain *will not kink*.

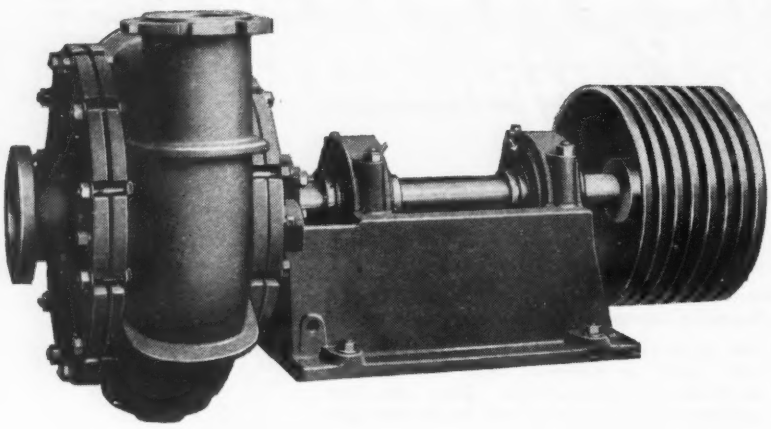
To cut *more* coal *faster* specify BOWDIL equipment now. Complete information on BOWDIL products will be sent on request. Address the Bowdil Company, Canton, Ohio.

bowdil "Headquarters for Coal Cutting Equipment"

Canton Ohio

DEMONSTRATED

"Life Expectancy" Makes Satisfied Users



MORRIS

Centrifugal COAL HANDLING PUMPS

It's as difficult to put your finger on the exact reasons for exceptional "life expectancy" in a pump as it is in a man. But basically the fundamental structure must be sound . . . and well-adapted to the environment. Overstrain must be avoided.

That's why Morris pumps feature larger shafts, larger and better-sealed bearings, more ample stuffing boxes, and heavier cast sections. To avoid excessive strain, wear and vibration, Morris pumps are designed to give top efficiency at moderate speeds. Flow through the pump—even of heavy slurries and highly viscous fluids—is smooth and constant, assuring uniform loading of the impeller and balanced radial forces acting on the shaft. Shaft deflection is negligible and packing wear is substantially reduced.

More Output With Less Power and Maintenance

Owners are usually amazed at the sustained efficiency, and at the lower power, labor and maintenance costs when figured on a year-in, year-out basis. The accurate dynamic balance of all rotating parts—the smooth, vibration-free operation—and the outstanding wearability of all parts—give maximum value for the dollars invested. *Write today for Bulletin.*

MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Branch Offices in Principal Cities

MORRIS CENTRIFUGAL PUMPS

1944 INDEX

Index for the 1944 issues of Coal Age, January to December, inclusive, has been printed separately. A limited number of copies are available to subscribers who desire them. Requests should be addressed to Coal Age, 330 West 42d St., New York 18, N. Y.

To this end it has undertaken a study of the lighting, particularly around the picking area, to determine the most satisfactory illumination from the following standpoints:

1. Kind of lighting or quality.
2. Intensity or quantity.
3. Location.
4. Direction.
5. Maintenance.

The power company has available competent illuminating engineers to undertake this study as a continuation of its service to its clients.

The generally accepted light over a picking table, said Mr. McQuail, was a 50-watt bulb in a tomato can. While a company sometimes invested several hundred thousand dollars in a preparation plant it did not follow through and spend a few hundred dollars in proper lighting so that the plant and its operating personnel could function efficiently. While there is a strong tendency to prepare mechanically a larger proportion of the mine output it is not possible to do this job entirely by mechanical means. Consequently the larger sizes still depend on visual inspection and manual cleaning, where proper lighting is essential. These larger sizes usually are that part of the output that brings the greatest market price.

The principal address was made by Mr. Altree. He stated that, generally speaking, picking-table lighting came under the head of "gloomination" rather than illumination. Studies made by General Electric have determined that picking tables should be lighted to the order of 250 to 300 foot-candles for the pickers to perform their job in an efficient manner. A lower level of illumination leads to inability to segregate the good from the bad but more importantly to a very high degree of eye fatigue. Long-continued work under these conditions not only means poor preparation and a substandard product but will tend to lead to eye disorders and a further decline in the physical efficiency of the workman.

Mr. Altree's studies have included various kinds and types of lights. The standard incandescent lamp is an efficient type of light source when the proper wattage, location and shading are used. However, it is unusual to find installations that meet all of these conditions.

So far, fluorescent lights have not been commercially produced with sufficient output to do an efficient job for coal picking. This type of light is now made in 40- and 100-watt sizes, which makes it difficult to obtain sufficient intensity. Further,

Here's information you can use, NOW!

New FIBERGLAS* ELECTRICAL INSULATION MATERIAL BOOKLET . . . TELLS WHAT TYPE TO USE, WHERE AND HOW . . .

This free, new booklet will be helpful to anyone concerned with the specification or application of electrical insulation.

It will help you determine which of the many types of Fiberglas electrical insulation materials should be used for a specific job.

The booklet will show you where this better insulation material can be used advantageously for electronic, radio and electrical applications.

It will indicate the ways to use Fiberglas electrical insulation material to obtain all of the benefits which it affords.

Containing complete information about Fiberglas, the new booklet illustrates Fiberglas fibers and filaments twisted into yarns, served on wires, woven into tapes and cloths, braided into sleevings and formed into tying cords.

It describes the unique combination of electrically and mechanically important characteristics of Fiberglas such as: high temperature, moisture and acid resistance, favorable space factor and high tensile strength. It shows how the insulating impregnants increase the effectiveness of Fiberglas' inherent characteristics and add others such as high dielectric strength, insulation resistance and resistance to abrasion.

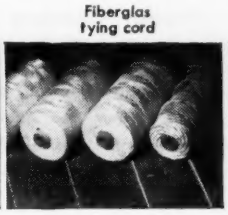
You will see why the use of this basic, inorganic, insulating material is increasing so rapidly—why so many designers, manufacturers and repair shop operators prefer it.

Be sure to have a copy of this new booklet in your file for ready reference. Write for your copy today —there is no obligation. Address: *Owens-Corning Fiberglas Corporation, 1862 Nicholas Building, Toledo 1, Ohio. In Canada, Fiberglas Canada Ltd., Oshawa, Ontario.*

Fiberglas varnished cloth and tape

Fiberglas insulated wire

Fiberglas tying cord



Fiberglas saturated sleeving and varnished tubing

Fiberglas laminated plastics

Fiberglas-mica combinations

FIBERGLAS

*T. M. Reg. U. S. Pat. Off.

ELECTRICAL INSULATION MATERIAL

Are Bearings the LIMITING FACTOR In YOUR Postwar *Design & Production*

Specify ROLLWAY *Right-Angle* LOADING *for*

1. Longer machine life
2. Greater machine efficiency
3. Less maintenance care

Whether your job is to re-design old products or to develop new ones, it breaks down into two phases:

1. **To design competitive sales appeal into the product; i.e., longer life, higher efficiency, and lower maintenance costs.**
2. **And to design or change-over production machinery for heavier loads, or higher speeds with less time out for service.**

In both of these, bearings are often the limiting factor. That's why Rollway's right-angle loading is so important. Right-angle loading insures that only simple loads are ever brought to bear on a single bearing. It automatically splits compound loads into pure radial and pure thrust . . . carries the radial load on a radial bearing, the thrust component on a thrust bearing . . . *both at right angles to the roller axis.* Oblique loads and their resultants are never introduced.

That means greater carrying capacity in given dimensional limits . . . or higher speed . . . or longer life . . . or proportional combinations of all three. It means lighter, more compact design . . . with firmer control over the distribution of stresses.

•

Proper Bearing Selection is a Specialist's Job; Let Rollway Engineers Help You

Just send a drawing or detailed statement of your problem and let our free Advisory Engineering Service help you in selecting the most efficient Rollway Bearings for your new and replacement designs. No obligation.

ROLLWAY BEARING COMPANY, INC., SYRACUSE, NEW YORK

BUILDING HEAVY-DUTY BEARINGS SINCE 1908 **BEARINGS**

SALES OFFICES: Philadelphia • Boston • Pittsburgh • Youngstown • Cleveland • Detroit • Chicago • St. Paul • Houston • Tulsa • Los Angeles

the fluorescent is a diffused light source and for this reason does not lend itself to producing the specular reflection from the coal that is possible from a point source of light.

The sodium vapor light, which is characterized by its monochromatic color quality, does not sufficiently bring out the color difference between slate, bone and coal.

The best light source for picking-table illumination, from studies so far made, seems to be the high-intensity mercury arc. This light is made commercially in the 400-watt size, which has an output corresponding to a standard 750-watt incandescent or a 1,000-watt high-voltage incandescent. The type of light is such that it is specularly reflected from the more or less cubular particles making up the pure coal and absorbed by the impurities, resulting in a sharp and readily recognized contrast between the two types of material. While the first cost is somewhat high, it is insignificant in comparison with the cost of the tipple of which it is an integral and essential part and to the value of the cleaned product whose preparation it improves. It is recommended that these lights be installed in the 400-watt size, spaced 4 ft. apart in line with the picking table and approximately 3½ ft. above the picking surface. The lights should be installed in R L M dustproof clear lens reflectors with radiating fins for heat dissipation. The installation should be in vibrationless mountings with a Thompson disconnect fitting that will allow them to be lowered at least once every two weeks for cleaning. The life of the mercury-arc bulb under normal operating conditions is 3,000 hours. A transformer is required for each two units.

The 250-watt mercury-arc light does not have sufficient "punch" to readily bring out the desired contrast and therefore the 400-watt unit is strongly recommended.

At the conclusion of the meeting the party was conducted to the service building of the Appalachian Electric Co., where the different lights that had been discussed were demonstrated under simulated operating conditions.

•

Insurance Rate Cut

A reduction averaging 15 percent in coal mine workmen's compensation insurance rates has been approved by Insurance Commissioner Gregg L. Neel of Pennsylvania. The cut, which it is estimated will save employers $750,000 annually, is effective Jan. 1. Average reduction in rates for anthracite mining is 14 percent; bituminous, 16 percent; surface mining, 18 percent; culm recovery, 14 percent; and coke burning, 7 percent. Rates for other classifications remain unchanged. Occupational disease rates for bituminous mining were cut 5c., with a 10c. reduction for anthracite mining. Experience rating also was approved for occupational diseases. The new schedule, proposed by the coal-mine section of the Pennsylvania Compensation Rating and Inspection Bureau, is said by Mr. Neel to be about 35 percent below that of 1939.

A 6.5 percent cut in rates for compen-

Stop!

COAL SCREEN LOSSES

use "BEE•ZEE" Round Rod SCREENS

ALL TYPES SCREENS

- Chute & Conveyor
- Rigid Panel Vibrator
- Heat Dryer
- Hook-type Vibrator
- Shaker Panel
- Centrifugal Dryer
- Sizing Screen

For long life in dewatering, sizing and drying operations in coal preparation plants, "Bee-Zee" Round Rod Screens are the answer. Round-rod construction increases efficiency, lowers plant maintenance expense, assures more continuous operation. Bee-Zee Screens are manufactured for all types of coal preparation equipment. Our engineering service can help you—call on us today.

BEE ZEE

BIXBY•ZIMMER ENGINEERING CO.

961 Abingdon Street • GALESBURG, ILLINOIS

Help speed coal to consumers

Freezeproof Shipments with Wyandotte Calcium Chloride

Mining coal twice—once at the mine and again when it's frozen in the car—means lost delivery time and extra labor.

Help hard-pressed dealers to meet delivery schedules this winter by freezeproofing your coal with Wyandotte Calcium Chloride.

Coal properly treated with Wyandotte Calcium Chloride unloads readily at any temperature. It comes out of the car the same grade as when loaded. Freezeproofing coal also conserves vitally needed cars by cutting unloading time.

No special equipment is needed to handle Wyandotte Calcium Chloride for freezeproofing. The material may be applied by hand shovel in dry flake form—exactly as it comes out of the bag.

Just fill in the coupon for information about Wyandotte Calcium Chloride—the safe, reliable and economical agent for treating coal.

Wyandotte REG. U.S. PAT. OFF. CALCIUM CHLORIDE

Michigan Alkali Division • Wyandotte, Michigan

WYANDOTTE CHEMICALS CORPORATION

WYANDOTTE CHEMICALS CORPORATION
Michigan Alkali Division
Wyandotte, Michigan

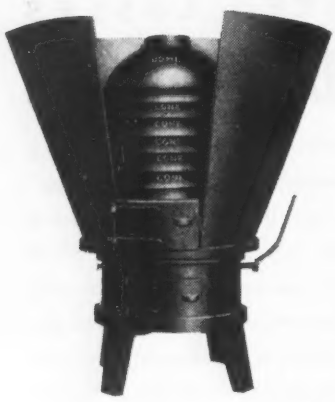
Send me literature and further information about the uses and advantages of Wyandotte Calcium Chloride.

Name _____

Address _____

Title _____

DRY SAND will help you haul more coal per trip!



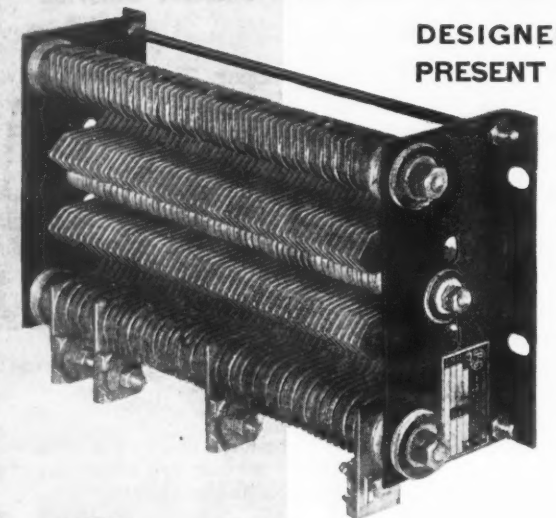
Heavy loads call for *sand*—really dry sand—running freely from locomotive to track in order that driving wheels may find traction and develop pulling power.

You can depend on having plenty of dry sand, at HALF the usual cost when you use the "PERFECTION" Cone Stove Sand Drier. The standard size dries 8 to 10 tons in 8 hours—and we can increase the size of the same drier up to 12 to 14 tons capacity. Let one of these units prove itself in your operations.

Write today for complete information on this and other Princeton products. Our facilities include Pattern Shop, Machine Shop, Grey Iron and Bronze Foundries for the manufacture of a wide variety of mining parts and accessories.

Princeton FOUNDRY & SUPPLY CO.
Princeton, West Virginia

P-G *Steel Grid* RESISTORS
CONSISTENTLY PROVE THEIR VALUE
for MINING MACHINES



DESIGNED TO FIT YOUR PRESENT RESISTOR SPACE

Built of steel and mica—nothing to break—no warping or hot spots—constant in resistance value, regardless of temperature or age. Not affected by vibration, moisture or corrosive fumes. Continuous trouble-free service is assured with . . .

P-G *"The Resistor you can Install and Forget"*

THE POST-GLOVER ELECTRIC COMPANY
•ESTABLISHED 1892•
221 WEST THIRD STREET, CINCINNATI, OHIO

sation insurance on coal-mine employees as of Jan. 1 has been announced by the Kentucky Workmen's Compensation Board through Secretary Pearl H. Hyden. The new rate on large mines will be $5.28 per $100 of payroll, against the previous rate of $5.80; small mines, $7.39, against $8.12.

•

Lehigh Conference To Be Resumed

Annual anthracite conferences are to be resumed at Lehigh University, South Bethlehem, Pa., according to A. C. Callen, dean of the College of Engineering. The conferences were suspended since 1941 because of the war. Technical papers proposed for the next conference, May 3 and 4, are to feature progress in production and utilization of anthracite in the last few years.

•

Association Activities

DOMESTIC COAL OPERATORS' ASSOCIATION OF WESTERN CANADA, embracing operators of Coalspur, Drumheller, Edmonton and northern areas, Lethbridge and Sanders Creek, has been organized. Membership will be open to all producers of coal, coke and briquets for domestic use in Alberta, British Columbia and Saskatchewan. C. A. Hyndman, Edmonton, secretary and commissioner of the Northern Alberta Coal Operators' Association, was elected president. First vice president is C. S. Donaldson, Lethbridge, general manager of Lethbridge Collieries, Ltd.; second vice president, E. A. Lovett, Calgary, general manager, Monarch Coal Mining Co.; secretary-treasurer, V. A. Cooney, Drumheller, secretary and manager of the Drumheller Coal Operators' Association.

HAZARD COAL OPERATORS' ASSOCIATION reelected officers at its annual meeting, as follows: president, George P. Fitz, president, Ajax Coal Co. (commencing his eleventh term); vice president, Paul Allais, president, Columbus Mining Co.; secretary-treasurer, A. E. Silcott, who also acts as labor commissioner.

ANTHRACITE MINE INSPECTORS' ASSOCIATION has elected as president for the coming year James M. Quigley, Mt. Carmel, Pa., inspector, 23d Anthracite District. Other officers named were: James Munley, Archbald, vice president; Kenneth Lee, Wilkes-Barre, secretary, and Theodore I. Wackley, Scranton, treasurer.

WESTERN KENTUCKY MINING INSTITUTE has elected as president Aubin Higgins, Earlington, Ky. William Kingston, Madisonville, is vice president; Arthur Wilson, Browder, second vice president; Herbert Hinton, Sturgis, third vice president; and Thomas O. Long, Madisonville, secretary-treasurer.

WINDING GULF OPERATORS' ASSOCIATION elected the following officers at its annual meeting: W. P. Tams, Jr., president; P. C. Graney, vice president; Austin Caperton, treasurer, and Hal M. Scott, secretary. Executive committee members

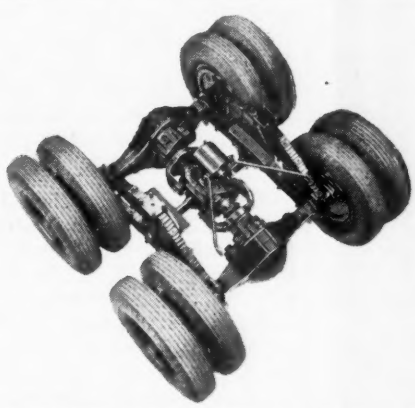
GET YOUR HEAVY DUTY TRUCK THIS SIMPLE WAY

Install a THORNTON FOUR REAR WHEEL DRIVE ON YOUR 1½-2 TON MEDIUM TRUCK

• New heavy duty trucks are very scarce, yet you need one badly to handle your hauling requirements.

Here's How You Get That Truck

Go to your nearest truck dealer and arrange to have a THORNTON Four-Rear-Wheel DRIVE installed. This will convert your new or used 1½-2 ton medium into a six-wheel, heavy duty truck . . . with two driving axles *under* the load . . . capable of hauling 100% more payload, climbing steeper grades, moving loads over bad ground conditions.



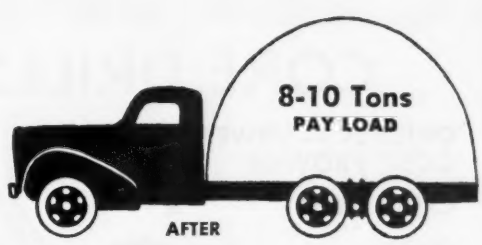
This is the THORNTON DRIVE, consisting of two driving axles; two-speed gear case assembly; "walking beam" type springs; wheels; tires.

THORNTON TANDEM CO.
8719 GRINNELL AVENUE • PLaza 9700
DETROIT 13, MICHIGAN, U. S. A.

Investigate **THORNTON** *Automatic-Locking* **DIFFERENTIAL** for Replacement in Truck Axles

In Canada see: H. V. WELLES, LTD., Windsor

And the cost of your converted heavy duty truck is less than the original cost of a new heavy truck of the same capabilities.



HERE'S WHAT YOU DO

Write for complete facts. Send for free descriptive folders today.

TEAR OUT AND MAIL

Thornton Tandem Co.
8701 Grinnell Avenue, Dept. 8
Detroit 13, Michigan, U.S.A.

Please send me catalog of facts on changing my 1½-2 ton truck into a heavy duty truck.

Name_____

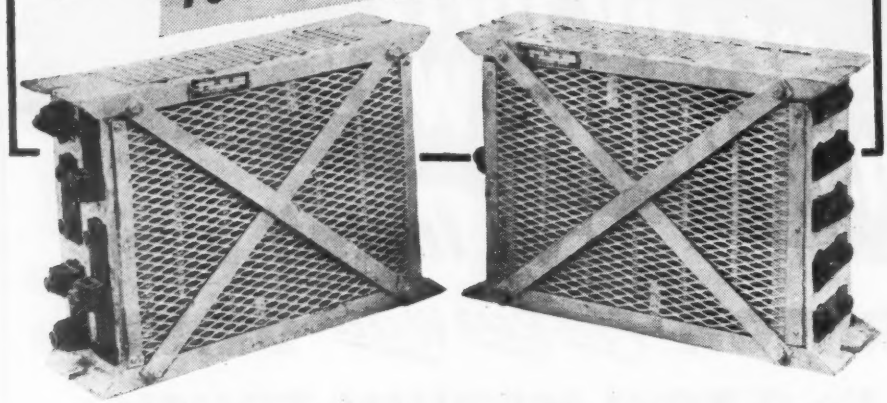
Address_____

City_____ State_____

Make of Truck_____ Year_____

Used for_____

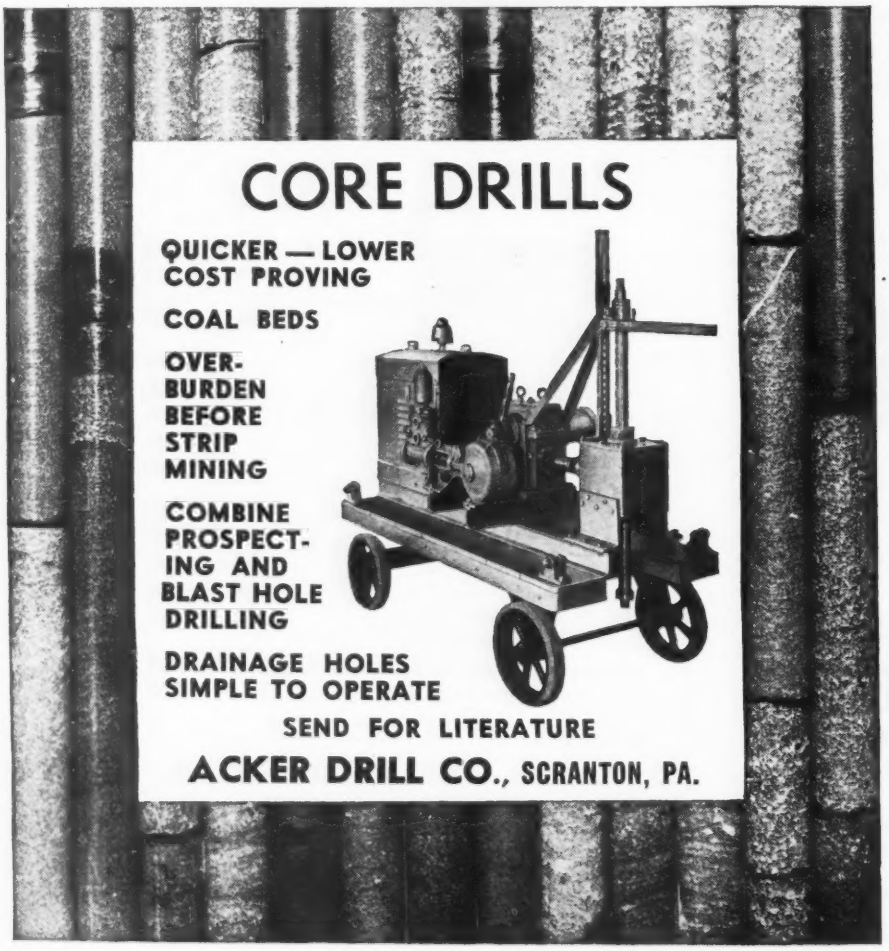
G.M.C. RESISTANCES for MINE LOCOMOTIVES



GUYAN Resistances are built in any size required. Their design incorporates helical coils of alloy wire, supported by an external frame, this completely protecting the units from injury. Coils are highly resistant to the action of mine water and mill fumes; and vibration does not affect them. Insulators are of a type not harmed by sudden changes of temperature. Construction includes a shield to protect coils from outside injury and foreign objects which might cause "shorts".

Full information on GUYAN Resistances will be sent immediately on request. Write today!

GUYAN MACHINERY COMPANY
Logan . . . . . West Virginia


CORE DRILLS
QUICKER — LOWER COST PROVING COAL BEDS
OVER-BURDEN BEFORE STRIP MINING
COMBINE PROSPECTING AND BLAST HOLE DRILLING
DRAINAGE HOLES SIMPLE TO OPERATE
SEND FOR LITERATURE
ACKER DRILL CO., SCRANTON, PA.

named include: L. T. Putman, J. W. Allstock, E. R. Lynch, A. W. Laing, E. C. Minter, P. C. Graney, T. C. Weeks, L. C. Campbell, F. R. Scholl, S. Austin Caperton and E. E. Jones.

MINERAL PRODUCERS' ASSOCIATION, Kittaning, Pa., has elected Robert T. Laing as executive secretary, vice William C. Altvater.

•

Quebec Receiving U. S. Anthracite

Under arrangements between Ottawa and the U. S. Solid Fuels Administration in Washington, anthracite is now being shipped direct from U. S. mines to make up for the drop in Canadian imports of Welsh coal, it was revealed Dec. 9. N. B. Zonnevylle, director of anthracite, said the arrangement is on a month-to-month basis, the supply sent to Quebec depending entirely on the quantity of Welsh coal received. The Maritime Provinces also have received U. S. anthracite, he said. Small quantities of Welsh coal have been coming from storage in Montreal.

Lifting of restrictions on domestic consumption of fuel oil was announced by oil control officials at Toronto Dec. 4. The easing of restrictions covers use of fuel oil in private homes in amounts exceeding 4,000 gal. annually, A. S. Morgan, executive assistant to the Federal Oil Controller, said. Morgan pointed out that domestic fuel-oil users were now at liberty to purchase fuel oil in excess of the quantity authorized by individual permit if they require it.

•

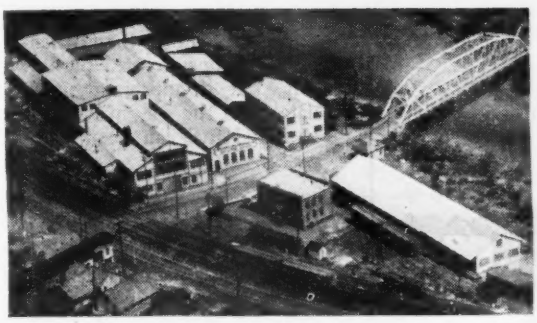
Coal Publications

Explanation and Justification of Tentative Inspection Standards for Bituminous Coal Mines and Lignite Mines, U. S. Bureau of Mines, Miners' Circular 45. 139 pp., 5⅞x9¼ in.; paper. U. S. Superintendent of Documents, Washington 25, D. C.; Price 20c. A bibliography of five pages shows where further justification for rulings may be found.

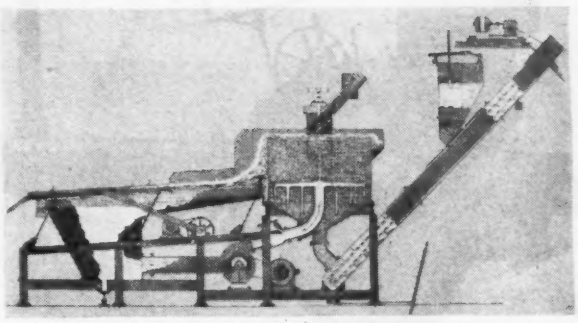
Prevention of Fires Caused by Electric Arcs and Sparks From Trolley Wires, by F. E. Griffith, E. J. Gleim, R. T. Artz and D. Harrington, U. S. Bureau of Mines. I.C. 7302; 10 pp., 8x10½ in.; paper. Discusses use of two-wire overhead trolley system, battery and diesel locomotives and the several defects of such equipment and of circuit breakers, also ways in which trolley system can be made safer.

Studies of the Effect of Humidity on the Sensitivity and Dispersion of Black Powder, by R. H. Moore and W. J. Huff, U. S. Bureau of Mines. R. I. 3782; 24 pp., 8x10½ in.; paper. Moisture makes black powder more susceptible to ignition by a flame or hot particle, unless the moisture is in sufficient quantity to disintegrate the powder. Fine-grain powders ignite more readily than coarse-grain powders. At a certain temperature, black powder by its own internal reactions generates enough heat to become steadily hotter, so that it

Anthracite Preparation at Its Best . . .



From this modern plant . . . .



this highly efficient Hydrotator.

WILMOT Hydrotators

The Wilmot Hydrotator Principle employs the function known as "Hindered Settling." The principle involved is the settling velocities of solids in water; the fact that, with a constant specific gravity of solid, the settling velocity varies directly as the size of the particles, while the heavier of two particles of the same size and shape settles faster.

In coal cleaning practice, the higher the gravity maintained, within certain limits, the better will be the separation. Upon obtaining the desired gravity by a suspension of solids in water, this suspension must be maintained with the least possible degree of agitation and an absolute minimum of upward current.

In the Wilmot Hydrotator Process an additional upward current serves to provide enough overflow to remove the lighter or "float" materials. In using this additional upward current a lower percentage of solids must be used to compensate for the lifting effect of the additional upward current.

Of the three classes of high gravity medium which may be applied, the Wilmot Hydrotator (or upward current classifier) uses the "Suspension of Materials Separated" principle. That is, rather than the use of sand or high density liquids, the coal fines are employed in the process, which eliminates the necessity of reclaiming the separation medium. The creation of a *uniform* upward current in and over the entire area of the separating tank frees it from "dead" spots and "eddy" currents.

Contrary to the usual practice, the Wilmot Hydrotator Process was developed in that part of the Anthracite field where the cleaning is most difficult. The success of Wilmot Hydrotators is just as effectively demonstrated where the problems of separation are less difficult but just as important.

Exclusive mechanical features give the Hydrotator definite advantages in (1) capacity for handling larger tonnages; (2) ease of operation; (3) lower power costs; (4) minimum operating, maintenance and repair costs.

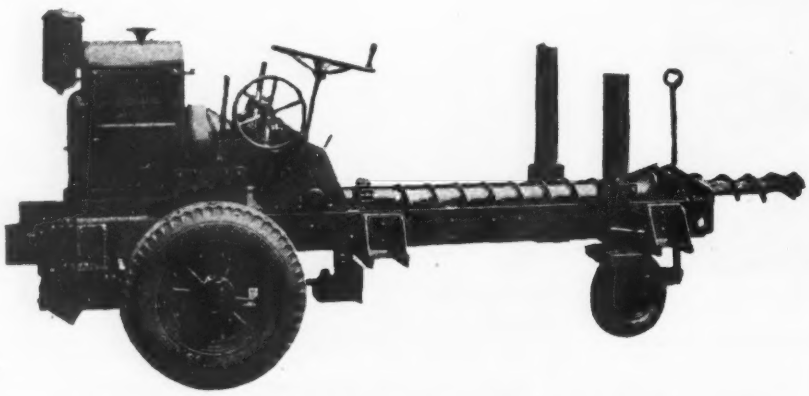
Plan now to increase the efficiency of anthracite preparation in your plant by installing Wilmot Hydrotators for peak wartime production and accelerated peacetime demand.

WILMOT ENGINEERING CO., *Foundry and Shops:* WHITE HAVEN, PA. **HAZLETON, PA.**

PARMANCO Horizontal Drills

"Positive Control Drilling"

Parmanco Horizontal Drills give you "Positive Control Drilling." Parmanco Vertical and Horizontal Drills are today's leaders in low cost, low maintenance drilling—All Parmanco Drills are equipped with patented Parmanco augers. Used by leading strip mine operators—Write us your drilling problems.



PARIS MANUFACTURING CO.

PARIS, ILLINOIS

The case hardened steel worms, bearing-bronze wheels, and copious lubrication give long life, without requiring attention other than occasional checking of oil level. The efficiency is high, reaching 97 per cent for certain ratios, and does not recede, but rather improves, with use. The transmission of power is shockless and noiseless.

Our engineers gladly supply data and give competent advice for the solution of speed transformer problems. Ask for Leaflet W-1128

DE LAVAL **WORM GEAR DIVISION**

of the De Laval Steam Turbine Co., Trenton, N. J.

MANUFACTURERS OF TURBINES · STEAM, HYDRAULIC PUMPS · CENTRIFUGAL PROPELLER ROTARY DISPLACEMENT, MOTOR MOUNTED, MIXED FLOW, CLOGLESS, SELF PRIMING CENTRIFUGAL BLOWERS and COMPRESSORS · GEARS · WORM, HELICAL and FLEXIBLE COUPLINGS

will ultimately explode spontaneously. Sensitivity to impact decreases with 2 or more percent of moisture.

Bureau of Mines Research on the Hydrogenation and Liquefaction of Coal and Lignite, by A. C. Fieldner, H. H. Storch and L. L. Hirst, U. S. Bureau of Mines. T.P. 666; 69 pp., 6x9⅛ in.; paper, U. S. Superintendent of Documents, Washington 25, D. C. Past pilot-plant investigations of the U. S. Bureau of Mines do not even approach a commercial scale, declares this technical paper. Inside diameter of present converter is only 3 in., whereas the British Billingham converters have inside diameters of about 5 ft. No one can predict the exact time when these processes can operate at a profit without subsidy, but it appears desirable to obtain data as to the way in which these sources of liquid fuel can be utilized when need arises.

Twenty-Second Annual Report of the Safety in Mines Research Board [of Great Britain], 1943. 30 pp., 6x9⅜ in.; paper. British Information Service, New York 20, N. Y. Price, 30c. Discusses effect on coal-dust explosions of imperfect mixing of coal dust and rock dust, composition of dusts as raised by an explosion, testing rock dusts by color, mechanical ignition of firedamp, strength of fireproof inclosures, spontaneous ignition of electric sealing compounds, safety with sheathed explosives, roof supports, effect of sprinkling on roof control, methane emission, roof and side control of roadways, car couplings and wire ropes.

Proceedings of Conference on Problems in the Utilisation of Small Coals (1943). 294 pp., 5½x8¾ in.; cloth. The British Coal Utilisation Research Association. Several addresses on use of slacks and slurries, use of impure coal and beneficiation of coal.

Air Compressors, by E. W. Feller. 460 pp., 5½x8½ in.; cloth. McGraw-Hill Book Co. Price, $4.50. An easily comprehended treatment of air compressors describing types available, how to select and install them and how to operate and repair them. A book for those on the job and in the repair shop.

Coal Mining Reference Book. 283 pp., 5⅜x8⅜ in.; paper. Kentucky Mining Institute. Price, $1.50. An elementary catechism on mining and first aid with rules governing first-aid and mine-rescue contests and Kentucky laws governing mining of coal and drilling of oil, gas and salt-water wells through coal beds. Answers are brief and to the point.

•

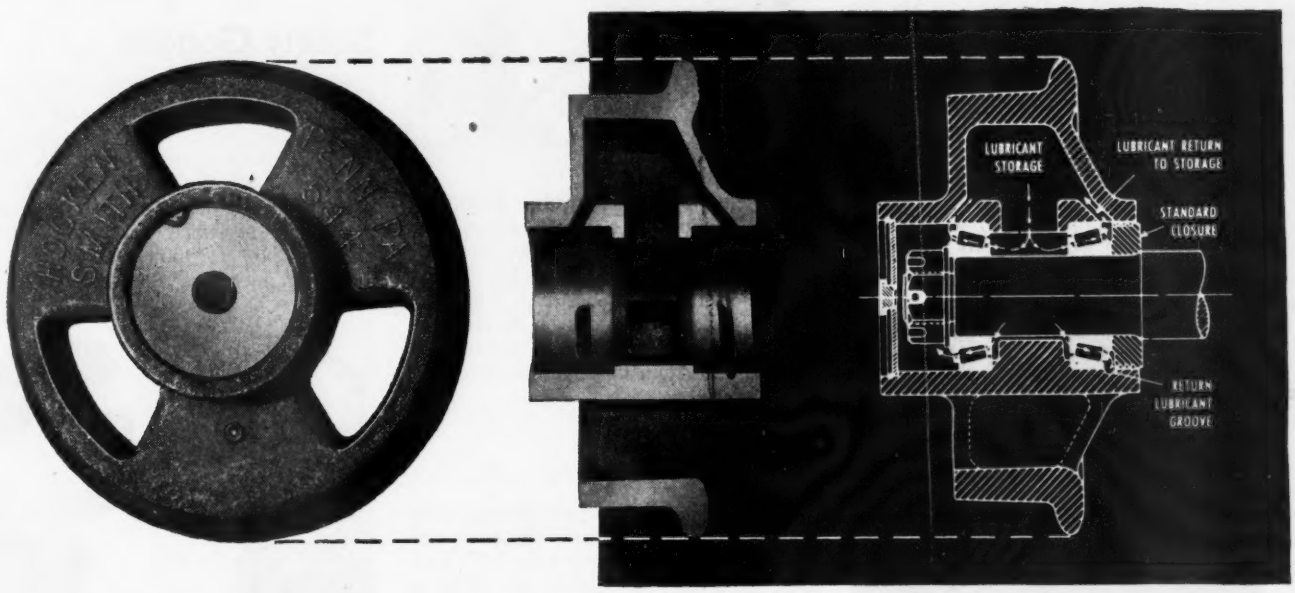
Fire Destroys Breaker

A coal breaker at Middleport, near Pottsville, Pa., owned by the Jones Coal Corp., of which John E. Jones is the directing head, was destroyed by fire Dec. 13 with a loss estimated at about half a million dollars. The structure formerly was owned by the Lehigh Navigation Coal Co., when it was known as Alliance colliery, being taken over several years ago by the Jones organization.

COSTS SAVED—BECOME PROFITS

The wheel with a built-in oiling system . . . .

ON THE JOB IN ANY KIND OF WEATHER



FREE-FLOWING, positive lubrication at the first turn of the wheel, under all temperature conditions—based on a unique principle of automatic lubrication—makes "Oilspok" Wheels the most profitable car wheels you can use. They give longer service and more satisfactory performance at lowest maintenance and labor costs.

Each spoke has three ports leading into the hub—one large central port and two narrow rectangular ports located at the outside of each bearing. The lubricant passes readily through the large central port to the bearings and is then thrown back through the rectangular ports by centrifugal force to the storage reservoirs. Each time the wheel stops, bearings get sufficient oil to last several days, and excess goes back to reservoir, eliminating churning resistance. Any type oiler can be furnished.

"Oilspok" Wheels can be made to fit your present axles. They are made with both standard and labyrinth enclosures, and for plain and roller bearings. Wheel design permits "spragging" like standard spoke wheels.

Save wheel costs. Use "Oilspok" Wheels. Write for full information. HOCKENSMITH WHEEL & MINE CAR COMPANY, *Established 1877, Penn, Pa., Phone—Jeannette 700.*

"OILSPOK" WHEELS WILL—

1. Increase Wheel Life. Excessive tread wear—caused by the churning resistance of heavy greases—is eliminated. Free wheel rotation.

2. Save Power. Free wheel rotation means no power lost by churning grease. The lubricant in the "Oilspok" wheel is fluid and free flowing.

3. Save Lubricant and Lubricating Labor. "Oilspok" lubrication is positive and continuous—no loss due to bearing pumping pressure or air expansion. One greasing lasts several years—less labor cost and loss of car service.

4. Give Longer Bearing Life. Bearing lubricant is constantly changed—bearings clean and cool—constant circulation maintains lubricant in better condition.

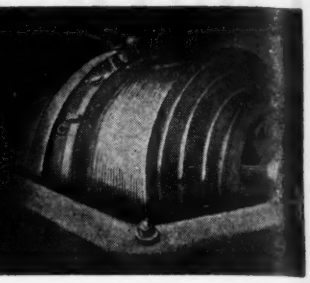
5. Increase Axle Box Life. "Oilspok" wheels are free turning under all temperature conditions—no chance of axles turning in dry boxes.

6. Eliminate Disadvantage of Small Diameter Wheels. Higher hub resistance—a characteristic of small diameter wheels with large bearings—is substantially reduced in "Oilspok" wheels with their positive, circulating fluid lubrication.

7. Provide Stronger Wheel—No Extra Weight. "Oilspok" wheels have tapered box-section spokes—the strongest possible construction for resisting side thrust and vertical loads. Same weight as standard wheels for various bearing and axle sizes.

Hockensmith *"Oilspok"* Wheels

TIPS FROM MANUFACTURERS



Blast-Hole Drill

A new high-speed blast-hole drill, the HS-15, for underground blast-hole or core drilling is offered by the Sullivan Machinery Co., Michigan City, Ind. Specifically designed for drilling long, small-diameter blast holes in stopes or pillar-robbing operations, it has a capacity of 500 ft. when used as a core drill or for grout hole drilling.

Incorporating a new method of driving the rods called "in-line-drive," it is said to provide a simple, rigid, vibrationless drive with few working parts to give a compact, lightweight, easy-to-handle unit.

This drill is powered by a single rotary (non-vane) type air motor designed to overcome irritating noise without the use of a muffler. It makes use of a reversible mounting, or two-position hinge plate, which allows the housing always to open downward when pulling rods. Complete details given in Bulletin D-32.

•

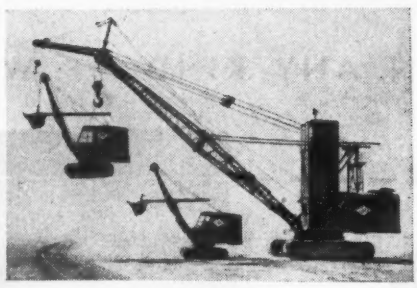
Aluminum Mallets

Empire mallets and Basa replaceable face hammers with aluminum heads and faces are offered by Greene, Tweed & Co., Bronx Blvd. at 238th St., New York 66, N. Y. The manufacturer states that besides being sparkproof and easily machined for refacing, aluminum is not brittle and does not chip; is tougher and more enduring than leather or plastics and withstands impacts better than copper or babbitt, at the same time absorbing shocks and minimizing operator fatigue.

•

Crane-Shovel-Dragline

Lima Locomotive Works, Inc., Lima, Ohio, offers a new crane, shovel and dragline designated as the Type 2000. As a crane it has a lifting capacity of 100 tons.



When equipped as a shovel or dragline it has a capacity of 5 cu.yd. It differs from other Lima machines in that the drums are in tandem. It is equipped with air control. Powered with either a diesel or electric power unit, it can be converted in the field, it is said, from one combination to another without major dismantling.

•

Live Center

A "live" lathe center for handling heavy loads up to almost 6 tons is offered by the Ideal Commutator Dresser Co., 1013 Park Ave., Sycamore, Ill. Called the 6MH, it has a guaranteed tolerance of 0.0000 to 0.0005. To handle radial loads up to 5,750 lb. and thrust loads up to 8,500 lb., a special bearing arrangement is used. Two precision ball bearings in tandem support the spindle at the front and two angular ball bearings, preloaded, support it at the rear of the housing.

In redressing the point the center is simply inserted in the lathe tailstock with the retainer plug removed. Then a small steel rod is screwed into the threaded hole in the end of the spindle of the live center. This center is made with the No. 6 Morse taper only.

•

Wood Preserver

To control or eliminate dry rot, fungi, insects and molds in wood, Quigley Co., Inc., 527 Fifth Ave., New York 17, N. Y., declares an application of Triple-A copper naphthenate wood preserver, applied by brush, spray or dipping, will deeply penetrate and impregnate the wood, sealing it against the destructive influences of wood destroying organisms, insects and molds.

After applying the preserver it should be allowed to dry for 48 hours before applying other paints or coatings for decorative effects. When a white paint is applied over the copper primer, use two coats to seal thoroughly against bleed-through; one coat of darker colors usually will cover satisfactorily.

•

Safety Goggle

A new improved Duralite safety goggle is offered by the American Optical Co., Southbridge, Mass., for workers who face the hazards of flying objects. A major improvement in the goggle is a newly designed eyecup that is considerably larger in area and more face conforming than the previous cup, to provide maximum eye protection, increased ventilation and greater

comfort. Shaped separately to fit the contour of the right and left eye, the cups are said to fit snugly against the face and protect the eyes from objects striking from the sides, top or bottom. Non-conductors of heat and electricity, the new cups provide wider angle of vision.

New nasal section and enlarged facial contact roll conform to the shape of the face. In addition, air channels in the edge of the eyecups, plus extra side perforations, provide increased ventilation. A natural draft accordingly is produced behind the lenses, reducing the possibility of fogging.

•

Earthmover

Designed for high-speed operations, the new Terra-Cobra self-propelled Earthmover, offered by the Wooldridge Mfg. Co., Sunnyside, Calif., embodies new features that are said to insure fast and efficient performance coupled with maximum safety of operation. Positive two-wheel hydraulic steering gives the operator full control of the unit at all times by maintaining a fixed direction of travel over all types of grounds and at all speeds. Both drive wheels turn at exactly the same time

J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE

PRECISION AND PRE-FORMING

MEAN PERFORMANCE FOR YOU

Like a sextant, J&L wire rope is a fine machine. It is made with *precision* and pre-formed for greater efficiency and longer resistance to wear and fatigue. Made from J&L Controlled Quality Steel . . . by men of skill and experience . . . J&L Permaset Precisionbilt Pre-Formed Wire Rope affords greater safety . . . helps keep operations at peak . . . protects your investment in equipment.

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

GILMORE WIRE ROPE DIVISION

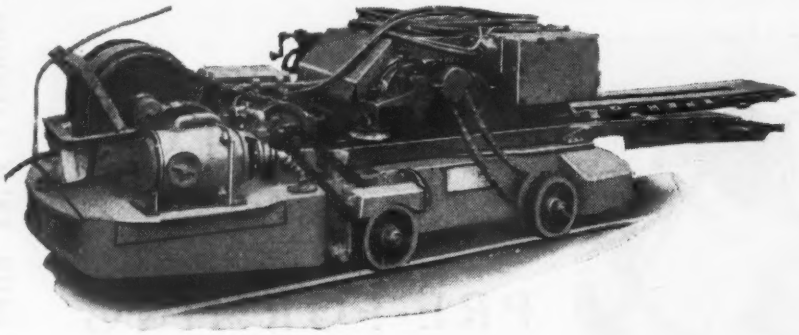
PITTSBURGH 30, AND MUNCY, PENNSYLVANIA

J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE

J&L PERMASET WIRE ROPE PRE-FORMED PRECISIONBILT • J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE

J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE • J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE

Lee-Norse TANK TRUCKS



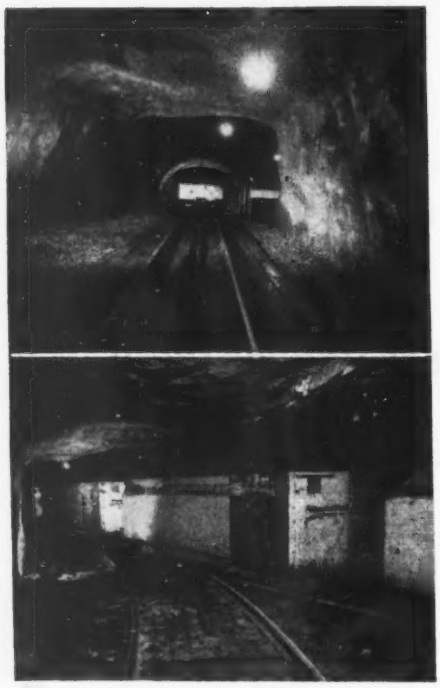
• This unit provides water spraying of the cutter chain—prevents dust and danger of explosion in workings. The tank of 180 gallon capacity is built into and becomes an integral part of the mining machine truck.

Safeguard your mine against the hazard of dust explosions with a Lee-Norse Tank Truck.

We completely overhaul and factory rebuild various kinds of mining machinery—cutters—loaders. Phone us—Charleroi 750.

Lee-Norse Company
CHARLEROI, PA.

CEMENT GUN COMPANY
"GUNITE" CONTRACTORS
GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.



MAINTENANCE COSTS ARE LESS

with "GUNITE" linings of roofs and sides of haulageways, slopes, entries and underground rooms.

"GUNITE" stops air slacking and eliminates most timbering. Roof fall hazards are minimized. The "GUNITE" surface is nearly white, resulting in much better visibility.

One inch of "GUNITE" is usually all that is needed but under particularly bad conditions it may be mesh reinforced and applied to a thickness of 2" or more.

The work can be done without hindering mining operations.

An application of "GUNITE" practically eliminates maintenance expense thereafter.

Write for our bulletin 2200, or better, let us drop in to discuss your problems with you.

MANUFACTURERS OF THE "CEMENT GUN"

under full traction and power by means of a single steering bar.

Powered by a heavy-duty diesel engine with four speeds forward plus a reverse gear, the Terra-Cobra attains travel speeds up to 20 m.p.h. on either short or long stretches.

•

Electric Hoist

American Engineering Co., Philadelphia, offers a new Lo-Hed ½-ton electric hoist. The motor is a heavy-duty ¾-hp. hoist- and crane-type unit with high starting torque. Gearing is heavy-duty spur type. The lowering brake is automatic heavy-duty Weston screw-and-disk type. The electric brake, built integral with motor, has full load torque capacity. Even the pushbutton control pendant and control cord are heavy duty, with the super-service cord reinforced by a steel pull cable. Chassis is heavy-gage pressed steel.

The weight of the hoist is 195 lb. for the bolt suspension type, 225 lb. for the plain trolley type. The trolley is said to be shockproof, specially designed to withstand the initial shock of electric hoisting and lowering. The body is streamlined, dustproof and finished in brilliant tangerine color. Descriptive bulletin on request.

•

Belt Fastener

A new fastener designated as Flex V, for A and B section V-belts, is offered by the Flexible Steel Lacing Co., 4607 Lexington St., Chicago 44, Ill. The fastener consists of two V-shaped end plates, an alloy metal hinge pin and self-tapping screws for securely fastening the end plates to the belt ends.

A simple applicator is used to prepare the belt ends, place and align the end plates and hold the screws upright during the actual fastening process. The separable hinge joint, it is said, permits quick, easy replacement of V-belts without dismantling line shafting or machinery. With no metal on the underside of the belt, Flex V-fastened belts also can be run on a V-flat drive.

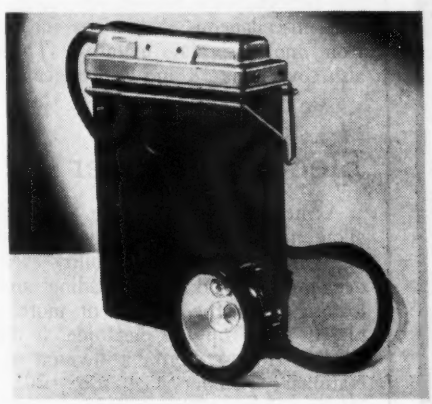
•

Goggle

A new fog-free goggle, designed by Polaroid Corp., Cambridge, Mass., and distributed by the Welsh Mfg. Co., Providence, R. I., employs flow channels to guide air circulation efficiently and a pump to keep air flowing constantly under all conditions. The flow channels are built into the goggle frame; the pump is the wearer's lungs.

Tim Malloy *says* . . .

- Why not have a Bright Future by using Wheat Approved Cap Lamps,
- And a Safe and Profitable New Year with Koehler Flame Safety Lamps.



WHEAT

the approved cap lamp

THESE FEATURES MAKE *WHEAT* THE OUTSTANDING ELECTRIC CAP LAMP

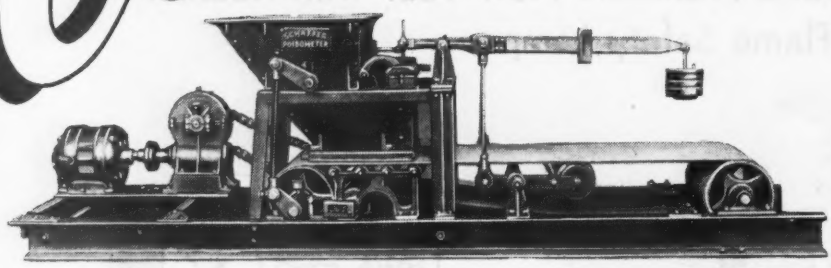
- Two bulbs (one for emergencies)—miner is never in the dark.
- Headpiece weighs less than 6 ounces, Lamp Cord 6 ounces, Battery 62 ounces—Total weight of Lamp complete, 74 ounces.
- Headpiece molded of strong bakelite, sealed, moisture-proof and dust-proof.
- Rubber battery case—non-conductor of electricity—a valuable safety feature.
- Battery solution (free) limited to one ounce total both cells.
- Lead-acid type battery maintains high voltage throughout shift (80+ percent efficiency)—year after year.
- Battery charged through headpiece and cord of cap lamp—a daily test of all connections.
- Designed for self-service charging system for lowest lamp-house operating cost.
- To charge, headpiece is simply slipped on to key in charging rack, and turned to make contact. Nothing to take apart—unit-sealed construction.

Write today—
WHEAT LAMP SALES, INC.
1501 Kanawha Valley Bldg.
Charleston, W. Va.

MANUFACTURED BY
KOEHLER MFG. CO.
MARLBORO, MASS.
SPECIALISTS IN MINE LIGHTING FOR 30 YEARS

OTHER SALES REPRESENTATIVES
E. D. BULLARD CO.
San Francisco
Chicago
B. C. EQUIPMENT CO., LTD.
Vancouver, B. C.
H. C. BURTON & CO.
Hamilton, Ontario
OLDHAM & SON, LTD.
Manchester, England

Over 1000



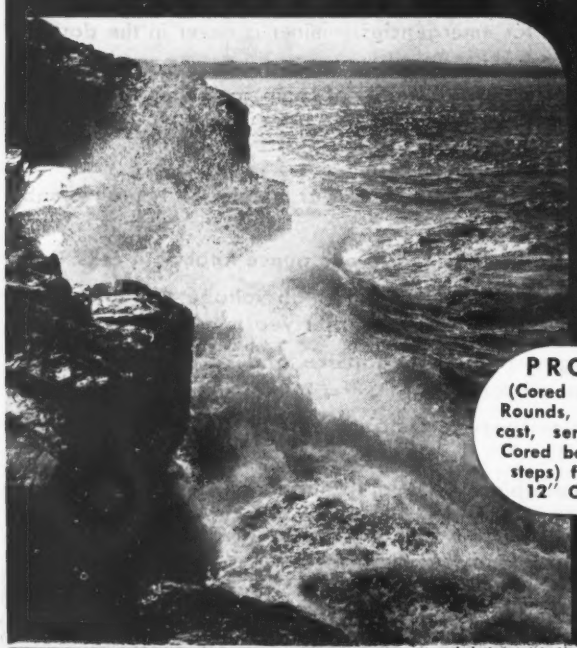
Schaffer Poidometers

Designed and Built to Serve Industry's Sizing and Blending Needs

Coal preparation is easy with the SCHAFFER Poidometer. Just set it to deliver the size, blend and weight you want . . . and then forget it! It automatically proportions, weighs and conveys crushed, granulated and pulverized coal . . . can be used singly or in batteries, and is available in extra lengths (pulley centers up to 35' 0") to eliminate extra conveyor expense. For a complete description of the Poidometer write for Catalog #8.

SCHAFFER POIDOMETER CO.,
2828 Smallman St., Pittsburgh 22, Pa.

ENDURING



Specializing in bronze bearings and bushings for coal mining equipment, we give you a money-back guarantee of superior service. Promet assures a specific formulae designed to best serve each application.

PROMET BAR STOCK
(Cored or solid). Machines easily. Rounds, hexagons, squares. Rough cast, semi-finished, fully machined. Cored bar stock in all sizes (by ⅛" steps) from a ½" minimum core to 12" O. D. and 12" lengths.

Parts for Jeffrey, Goodman, Westinghouse, General Electric, Sullivan, Joy Equipment, etc. *Write for free booklet.*

PROMET THE Engineered BRONZE

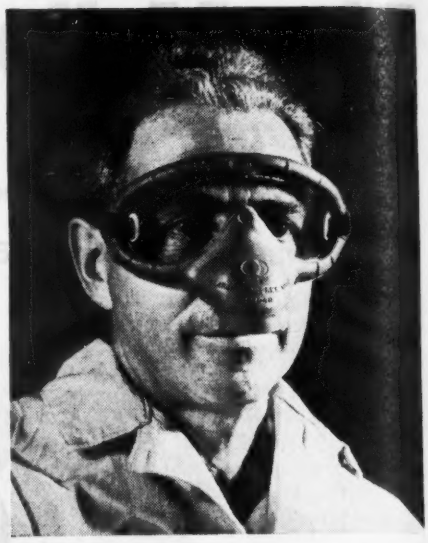
THE AMERICAN CRUCIBLE PRODUCTS CO.
1307 Oberlin Ave., Lorain, Ohio, U. S. A.

Prompt deliveries can usually be made from stocks maintained at

BECKLEY, W. Va., The Universal Supply Co., Corner 2nd Ave. and 2nd St.	Phone 1642
LORAIN, OHIO, The American Crucible Products Co.	Phone 6983
WILLIAMSON, W. Va., Williamson Supply Co.	Phone 1200

Other Representatives

ALTON, ILL., Frank E. Rhine, 623 Blair Ave.	Phone Alton 3-8624
BIG STONE GAP, VIRGINIA	C. P. Cawood
BIRMINGHAM 1, ALA., O. O. Lindstrom Equipment Co.	P. O. Box 103
CANTON, OHIO, Bowdil Company, Waynesburg Road	Phone 29-806
MT. LEBANON, PA., T. L. Meyer, 720 Roselawn Ave.	Phone LE 9876
DENVER, COLO., Urquhart Service, 15th Street at Eliot	Phone Main 0151



Fitted with a bulbous nosepiece, normal breathing sweeps a complete change of fresh air in front of the wearer's eyes about once every second. This action is said to remove moisture from within the goggle before there is enough of it to condense as fog on the plastic lens, thus providing unblocked vision as well as eye protection against dust and other flying particles.

•

Tax Chart

Delbridge Calculating Systems, Inc., 2502-10 Sutton Ave., St. Louis 17, Mo., offers its simplified withholding tax chart. Published in four editions covering weekly, bi-weekly, semi-monthly and monthly payroll periods, each edition also shows daily and miscellaneous deductions for periods from one to six days inclusive. The chart also covers the 18 and 22.5 percent rates.

•

Electrode Holder

A new electrode holder designed to allow unobstructed visibility while welding and maximum accessibility even for deep-pocket work, fast loading and reloading, plus the feature of more completely using up the electrode, is offered by the Hollup Corp., a division of the National Cylinder Gas Co., 205 W. Wacker Drive, Chicago 6, Ill.

With the "Shortstub" holder, only ½ in.,

Safety Goggles are CHECK PROTECTORS too

An eye accident can cost as much as a raised check — frequently $1000 or more. Yet, according to conservative estimates, 98% of all eye accidents are preventable. The wearing of safety goggles practically eliminates the danger from eye hazards. And the price of such protection is low . . . only about $1.50 per employee.

Your Safety Director can show you how an adequate eye protection program can materially *reduce your production costs*. Why not let him work out the details with an AO Safety Engineer?

American Optical
COMPANY
SOUTHBRIDGE, MASSACHUSETTS

CALL IN AN AO MAN AND KEEP YOUR PRODUCTION EYES PRODUCING

ACME
mine car
COMPRESSOR

This mobile unit only 127 inches long—weighing only 3510 pounds—each end provided with coupling for towing—delivers 92 cu. ft. of air per minute at 100 lbs. pressure.

Designed especially for mine use it is adaptable to both high and low seam operations only 27½" high—particularly mechanized mining.

The car is equipped with one floating and two stub axles eliminating danger of derailment. Furnished in track gauges from 36" to 56".

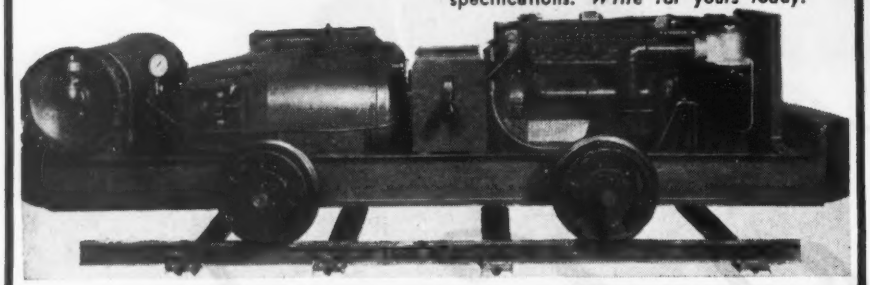
The "Lowboy" Model 110 shown offers the latest in mine car compressors—sturdily built—efficient—economical to operate.

WRITE FOR BULLETIN 3920

This bulletin shows how well the "Lowboy" is built—details of construction—illustrates sturdy frame design and gives complete specifications. *Write for yours today.*

Light Weight
Low Height

Compact
Mobile



ACME COMPRESSOR CO.
Williamson, West Virginia

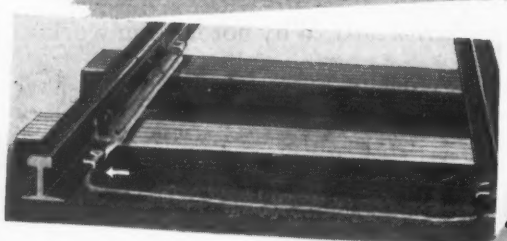
The Searchlight Section of Coal Age

features Employment, Equipment and Business Opportunities identified with the mining of coal.

"Searchlight" ads are referred to regularly by readers interested in such "Opportunities."

You can therefore bring "Opportunities" you have to offer to the attention of these readers quickly, and at small cost, through an advertisement in the Searchlight Section. (See pages 183-187.)

FLASHWELDED RAIL BONDS for SUPERIOR BONDING



Mescoweld Rail Bonds are available in 18 styles, all Flashwelded, providing more oxygen free copper welding to steel terminal which gives maximum cable conductivity. Note the over-size terminal for welding to rail.

Type M8x-F combination Joint and Cross Bond in position

Write for Catalog No. 44 or phone HEmlock 8332 for your copy.

MOSEBACH ELECTRIC AND SUPPLY CO.
1115 ARLINGTON AVE. PITTSBURGH 3, PA.

it is said, is needed for a tight, efficient current contact in the holder jaw; an extension of the holder itself allows the now usable stub end of the rod to be projected into the proper position for welding. Completely insulated, the "Short-stub" is said to load and unload in a second, and, because of its perfect balance and light weight, to minimize operator fatigue, with practically complete use of valuable electrode metal.

•

Plastic Packing

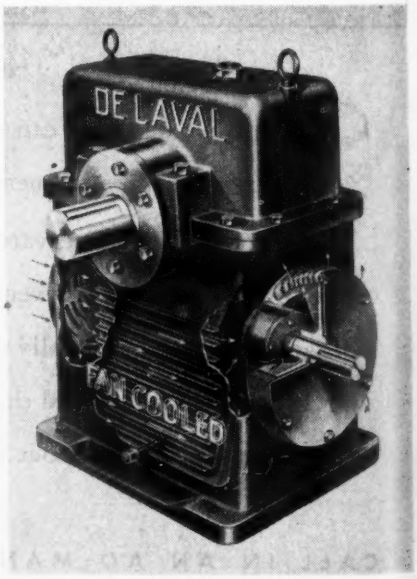
To meet a growing demand for packings of the plastic type, Greene, Tweed & Co., 4377 Bronx Blvd., New York 66, N. Y., offers Palmetto plastic packing. Lasting lubricating effect is said to be obtained with this new packing by combining graphite with flakes of soft anti-friction metal. These two lubricating agents are distributed evenly throughout long fine fibers of asbestos and the whole is thoroughly mixed with a special heat-resistant binder. The mixture is then formed into continuous lengths by an extruding operation that gives the packing a square outline.

It is asserted that the asbestos makes a strong heat-resisting bond, the binder gives resiliency and stability under pressure, and the graphite and metallic flakes minimize frictional wear.

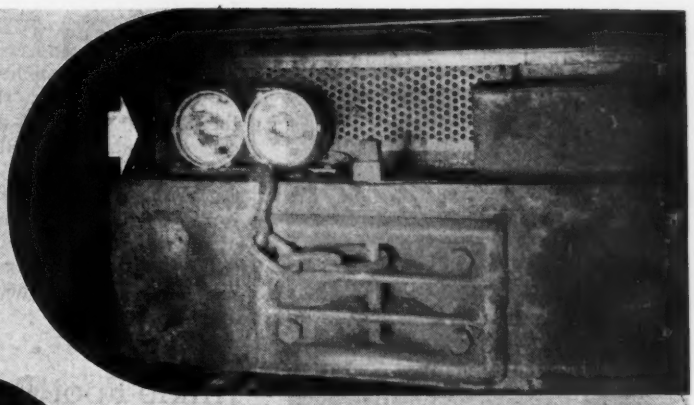
•

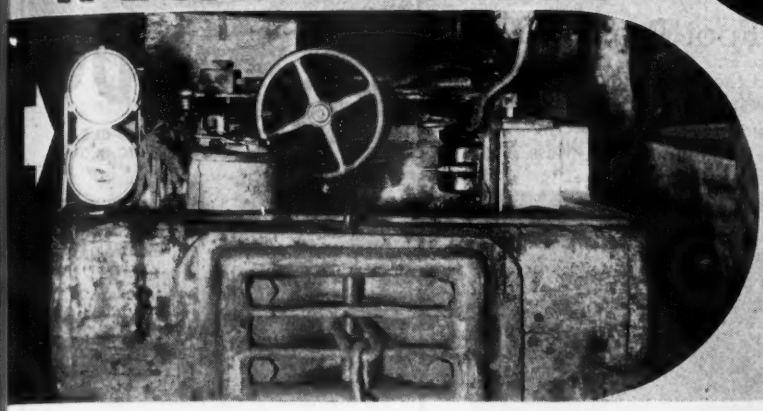
Worm Gear

Heretofore, the capacity of worm gear speed reducers operating at high speeds has been limited not by the strength of the materials but by the ability of the casing to liberate heat that otherwise raises the temperature of the oil and breaks down the film of lubrication between worm and gear. Forced air-cooling, as employed in the new fan-cooled unit offered by the DeLaval Steam Turbine Co., Trenton 2, N. J., is said to remove the heat so effectively that the capacity of the gear is doubled for practically all ratios and sizes at 1750 r.p.m. This, it is asserted, permits the use of smaller, lighter and less



Twinlite LOCOMOTIVE HEADLIGHTS





GREATER SAFETY AND FASTER HAULAGE SCHEDULES

•

Give More Light

A LETTER FROM A MINE SUPERINTENDENT

THE MINE "B" COAL COMPANY

CARL H. KLEMPP, PRESIDENT

SPRINGFIELD, ILLINOIS

May 20 1942.

Mr. Melvin C. Young,
1404 North Fourth Street
Springfield, Illinois.

Dear Sir,-

Having used your twin headlights on our locomotives over quite a period of time, I am pleased to make a report as to the extremely satisfactory service rendered.

The first twinlites you built for us were installed late in 1939 and we now have eleven locomotives using them.

The lighting obtained from your twinlite system, in my opinion, represents the most radical illumination ever applied to mine haulage locomotives. The improvement in lighting on our locomotives has resulted in greater safety and faster haulage schedules.

The operating cost of the twinlite system has been very reasonable. Barring wreckage, lamp life ranges from six months to a year, while batteries last two years and longer.

Our haulage men are very enthusiastic in their endorsement of your twinlites and I personally recommend them to any one contemplating their use.

Any interested persons are welcome to inspect this equipment at our mines A or B.

Yours very truly,
The Mine "B" Coal Company.

Oscar Falcetti
Superintendent.

O.F.
D.C.B.

This letter opposite is typical of those we receive from mining men who have installed our TWINLITE System of mine locomotive headlighting.

For good reasons: Motormen can see clearly what is ahead of them on the track and in the haulage way. There are fewer accidents, and less injuries to men (with man-hours on the job precious these days). There are fewer derailments and damaged cars. (You can't afford many mishaps now.) And — the TWINLITES stay in service longer, with fewer renewals.

All these betterments are important in Wartimes, when men and equipment are both scarce, and every ton of coal is needed in the War effort.

TWINLITES are NOT simply double headlights

it is a *system* of lighting, with special built batteries, which take power from the trolley, and continue to give light when the trolley slips the wire. Its economy charging circuit makes possible the lighting of two lamps by taking no more power than if ONE were burned.

It uses twin Sealed Beam, two-filament lamps, built for us by GENERAL ELECTRIC, with two spare filaments in reserve, as only one filament is used at a time. The batteries supply constant voltage, despite variations in the trolley voltage.

TWINLITE pays big dividends in SAFETY as well as increasing HAULAGE SPEEDS and PRODUCTION.

Write for the full descriptive data.

W. M. HALES COMPANY

Manufacturers of Replacement Parts for

COAL CUTTING MACHINES . . . LOCOMOTIVES . . . LOADING MACHINES

MINE EQUIPMENT AND SUPPLIES

Chicago Office
605 W. 116th STREET
Telephone — Pullman 1595

Factory
DANVILLE, ILL.
Telephone — Main 2398

St. Louis
HOTEL MAYFAIR
DOWNTOWN ST. LOUIS AT YOUR DOORSTEP

HERCULES AUGERS

Hercules Augers

Ideal for modern high speed electric drills—withstands whips and torsional strains. Flint hard and tough as whalebone. Drills faster—drills more holes with resharpening—outlasts four to five ordinary drills. Recommended for the hardest jobs. Up to 3" diameters—up to 16 ft. in length.

Black Diamond Augers

Carefully made from high-carbon crucible grade steel—heat-treated to obtain as much hardness and toughness as possible, to prevent broken tangs and points. Furnished up to 2" diameters—maximum over-all lengths 16 ft.

Standard Augers

Originally developed for use with hand drills. These augers work best at hand drilling drilling holes under stumps, and ditch blasting. Up to 2" diameters from oval steel, 7/16" thick, and maximum length of ten ft.

Call on us for any type auger you may require in your operations. We specialize in manufacturing the better grade alloy, heat-treated augers. Write, wire or 'phone for details concerning sizes, prices, deliveries, etc.

SALEM TOOL COMPANY
SALEM OHIO

expensive speed reducers, without sacrifice of efficiency or durability.

A fan mounted on the worm shaft of the DeLaval unit draws air at high velocity over and around heat-dissipating ribs on the air side of the oil reservoir housing the gearing. The use of a double wall, it is stated, greatly increases the effectiveness of the cooling by confining the cooling air to the housing and thus secures the close air-to-metal contact necessary for maximum heat transfer.

•

Ankle-Foot Protector

Ankle and foot protection against acids, alkalis, oils, solvents and greases is provided by a new spat offered by the American Optical Co., Southbridge, Mass. Made

from a coated fabric said to give the same protection as rubber, it is asserted that the spat is much lighter in weight and extremely flexible. Neat, snug-fitting and comfortable, it may be worn with trousers over it or tucked inside.

•

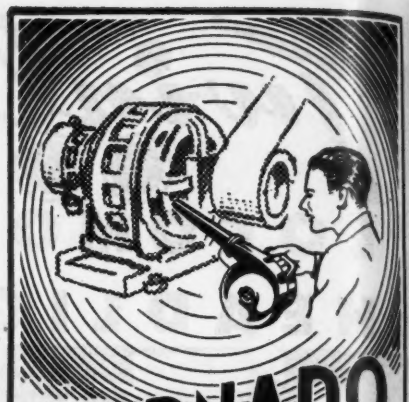
Industrial Notes

Wheat Lamp Sales, Inc., Charleston, W. Va., a division of the Koehler Mfg. Co., has appointed R. A. Lambie as sales representative for southern West Virginia. He is a son of R. M. (Bob) Lambie, president of Wheat Lamp Sales, Inc., who for 13 years was chief of the West Virginia Department of Mines. To accept this position Bob Jr. resigned from the Carbide & Carbon Chemicals Corp., South Charleston, where he had been employed since leaving West Virginia University.

B. F. Goodrich Co., Akron, Ohio, announces that John C. (Josh) Billings has joined its truck and bus tire department and will handle sales of industrial and solid tires.

General Electric Co., Schenectady, N. Y., has elected as a vice president Dr. C. G. Suits, assistant to the director of the research laboratory. Dr. W. D. Coolidge retired Dec. 31 as vice president and director of the research laboratory, a post he held since 1940.

Edward E. Helm, since 1928 district sales manager in Philadelphia for the Reliance Electric & Engineering Co., Cleve-



TORNADO
PORTABLE ELECTRIC BLOWER
reduces DUST DANGER

BLOWS clean, dry air, at 295 m.p.h. Cleans out motors, generators and hard-to-get-at places—removing dust, dirt, lint and chips. Costs less than 3c an hour to operate. Reduces damage to motors and bearings—lessens fire and health hazards.

1 H.P. universal G.E. motor. Weight, 14 lbs. Portable to any place in plant. Plugs in at convenient outlets. Adaptable as Sprayer for spraying paint and insecticide. Convertible into powerful industrial Vacuum Cleaner—for cleaning floors, walls, ceilings, etc.

Free Trial—Write to
BREUER ELECTRIC MFG. CO.
5098 N. Ravenswood Ave., Chicago 40

TAKE THE DUST OUT OF DUSTY JOBS
TORNADO
PORTABLE ELECTRIC BLOWER

MOTT
DIAMOND CORE DRILLING
CONTRACTORS

Mott Type "A" Oil Hydraulic 1500 Ft. Cap., 2¾" Diameter Core.

● Coal and all mineral properties tested—using our light gasoline drills. They save fuel and moving costs . . . guarantee satisfactory and proper cores.

Pre-pressure grouting for mine shafts . . . ground solidification for wet mine areas by our stop grout method. Water wells and discharge holes drilled and grouted . . . electric drills for inside mine drilling.

MOTT CORE DRILLING CO.
HUNTINGTON • WEST VIRGINIA

AGGREGATES HANDLING

MINE FAN DRIVE

GRAIN ELEVATORS

CARBON BLACK STORAGE

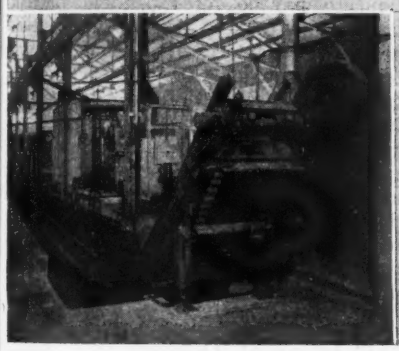
Whatever your requirements in the conveying and power transmission field, Continental is equipped to engineer and manufacture the correct equipment to fill your needs. Some typical installations and items of equipment are illustrated. Specify CONTINENTAL, Engineers and Manufacturers of Conveying, Elevating and Power Transmission Equipment.

PENNANT AWARDED October, 1941

1st renewal (Star) May, 1942
2nd renewal (Star) October, 1942
3rd renewal (Star) April, 1943
4th renewal (Star) December, 1943

SAND HANDLING

SPECIAL CONVEYORS



SCREW CONVEYORS, FEEDERS, TANKS

POWER PLANT INSTALLATION

INDUSTRIAL DIVISION

CONTINENTAL GIN COMPANY

BIRMINGHAM, ALABAMA

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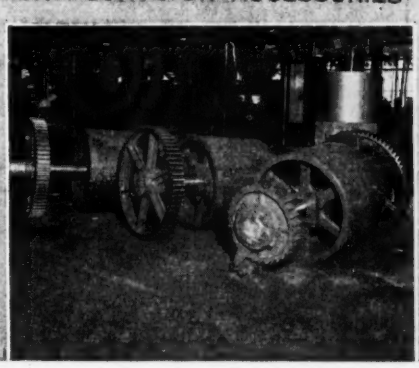
UNDERGROUND CONVEYORS

BELT CONVEYOR ACCESSORIES



CEMENT PLANT CONVEYOR

land, has been appointed general sales manager for the company. Kenneth S. Lord will succeed Helm as manager of the Philadelphia district.

Pittsburgh Plate Glass Co. has appointed C. Robert Fay as comptroller, vice Stuart M. Campbell, resigned.

Wickwire Spencer Steel Co. has appointed R. L. Hoenstein as superintendent of its Mt. Wolf (Pa.) plant.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has appointed P. C. Smith as assistant to the manager of the transportation and generator division. J. S. Askey, G. L. Moses and P. G. Lessman have been named as section engineers in the department.

George W. Mitsch, since 1935 assistant manager of foundries of the Madiston and St. Louis plants of the American Car & Foundry Co., has been appointed operating manager of foundries. Justus W. Lehr has been named district manager in charge of the Chicago plant. He formerly was assistant manager at the Berwick plant. R. A. Williams has been placed in charge of sales, succeeding William L. Stancliffe, who recently resigned from these duties.

Caterpillar Tractor Co., Peoria, Ill., has advanced Merwin T. Farley to the post of supervisor of parts depots. His responsibility for parts processing has been assigned to D. M. Gilbert, general superintendent of parts, and Harold H. Bosecker has been advanced to superintendent of parts processing.

Shaffer & Co., Brazil, Ind., is to represent the Marion Steam Shovel line in southern Indiana and eastern Kentucky, with complete service.

United States Rubber Co. has appointed H. S. McPherson, St. Louis, as midwestern sales manager of the mechanical goods division and has shifted W. M. Ballew, Kansas City, Mo., to the post of southwestern sales manager.

•

Trade Literature

Crane—Silent Hoist Winch & Crane Co., Brooklyn, N. Y. Catalog 58, on the Krane Kar mobile swing boom crane, gives concise specifications with on-the-scene shots highlighting practical applications in loading, unloading and transporting materials—1 to 10 tons—under the most difficult conditions.

Splicing System—B. F. Goodrich Co., Akron, Ohio. Folder on banding and splicing electrical applications describes the tools used in the Punch-Lok method, lists sizes of preformed and open-end clamps available in Everdur, a copper brass alloy for electrical use, and tells in step-by-step detail how to apply the Punch-Lok bands on many electrical jobs such as connecting, spicing, reinforcing, tying and repairing lines.

Mining Equipment—Lake Shore Engineering Co., Iron Mountain, Mich. Catalog 446 describes mining sheaves, giving data and specifications on Timken-bearing-type head sheaves and rotating-shaft and split-type head sheaves. It also describes cast-iron, plate-steel and lightweight plate aluminum idler sheaves, the latter furnished with Hyatt roller bearings. A cast-iron carrying sheave equipped with solid rubber liners and bronze bushings or Hyatt roller bearings also is shown. Catalog 448 features the Lake Shore Lohed tram car with illustrations and descriptive material on the model equipped with a bracket for cylinder dumping, and on the car with rollers for camel-back and cylinder dumping.

Coke Ovens—Wilputte Coke Oven Corp., 40 Rector St., New York 6, N. Y. Catalog incorporates design, structural features and operating facilities of the Wilputte coke oven, illustrated with cross-sections, flow diagrams and views of recent installations. The descriptions reflect advances that have been made to attain strength and easy and economical operation; to provide for expansion, prevent leakage and to keep pressure differentials low. The advantages of the under-jet system and high and low burners for rich gas firing are dealt with fully. Of particular interest is the chapter on bus flues, ports and regenerator chambers, which are designed to equalize the flow of lean gas and air upward and products of combustion downward. The mechanical features described include the Wilputte self-sealing oven door and leveler door and the hydraulic door handling equipment.

Face Shields—Boyer-Campbell Co., 6540 Antoine St., Detroit 2, Mich. Bulletin FC1044 describes the new "Hundred Series" face shields, including the "100," "200," "300" and "400" models, each identified by a variance of headgear but all designed upon the primary premise of comfort. For each model there is a choice of three different thicknesses and three different sizes of cellulose acetate general-purpose windows for heat protection and a fiber front for scarfing and welding.

Cable Entrances—Delta-Star Electric Co., Chicago 12, Ill. Publication 4412 describes through-type compound-filled cable terminators or potheads. Five types of cable entrances with wiping sleeves, for conduit stuffing boxes, for braided or lead-covered cable and mechanical conduit entrances are furnished.

Cable Terminator—O. Z. Electrical Mfg. Co., Brooklyn, N. Y. Catalog gives complete details of the Type J terminator and other new products, illustrating and describing, with specifications and price lists, the full O. Z. Line, including conduit fittings, cable terminators, junction boxes, solderless connectors, power connectors and grounding devices.

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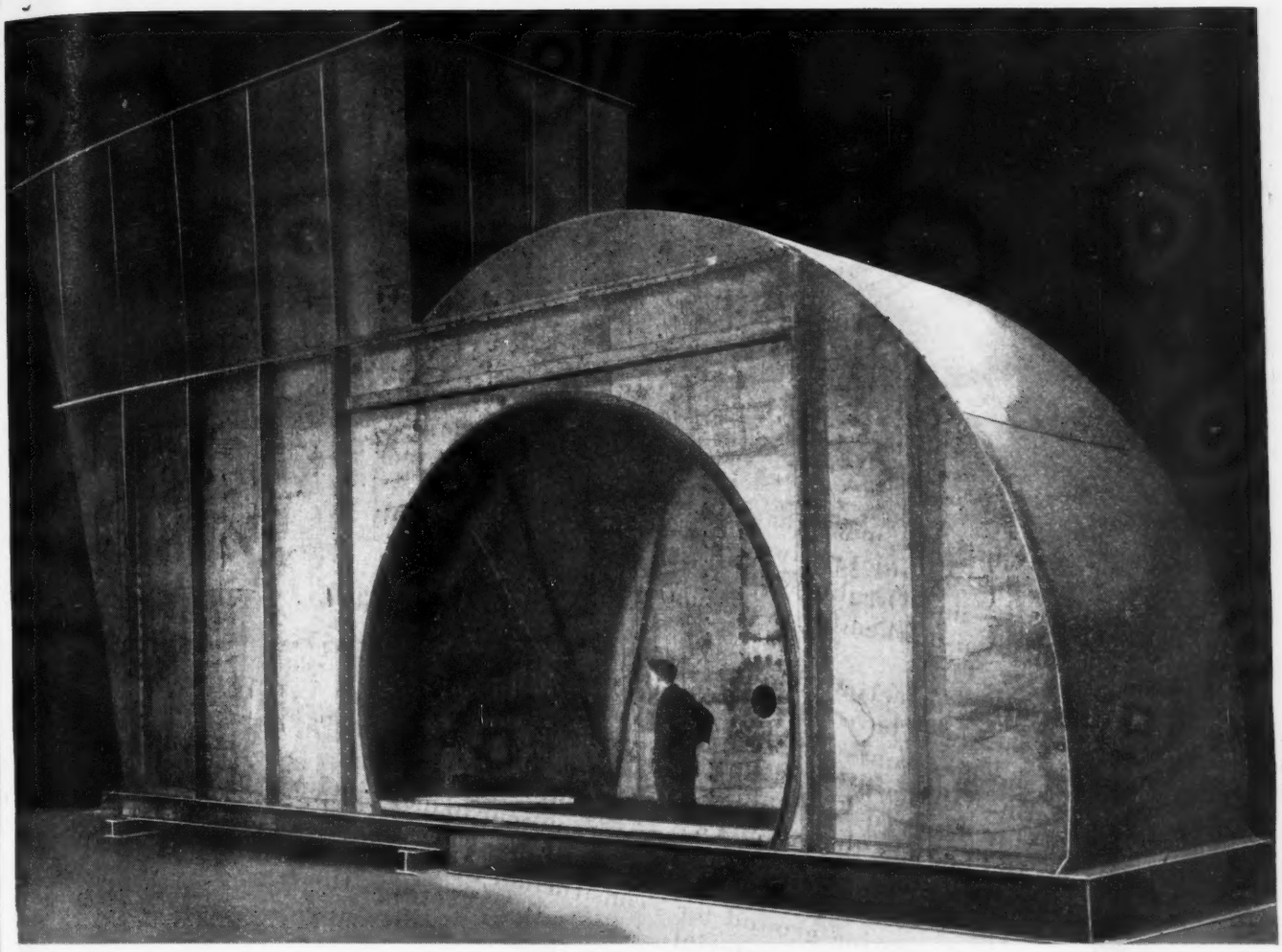

Easy to live with . . .

Maintenance and Installation Data

Booklet illustrated above gives much useful information on installations and care of ventilating fans and air washers. Free if you write for a copy.

Operating crews know that while fan efficiency is important, dependability is what keeps the mine operating. "Buffalo" fans are "easy to live with," because shutdowns for fan trouble are practically unknown. This is because "Buffalo" engineers with their 66 years of experience in fan design, know how to design an efficient HEAVY-DUTY fan, so that rotor, shaft and bearings can be installed and forgotten, except for lubrication.

Many installations in coal and metal mines testify to the value of this accumulated "know-how".

Why not enjoy the efficient, "durable" performance which Buffalo Mine Ventilating Fans can give you? Write us for complete information when you are considering fan equipment.

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Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo" "First For Fans"

Fans for Mine Ventilation

after VICTORY

We enter the new year with a profound feeling that Victory is not far away—that soon LIMA Shovels, Cranes and Draglines will be coming off the assembly lines ear-marked for peacetime operation.

When peacetime comes LIMA will have a line of Shovels, Cranes and Draglines that will be especially designed and built for the big jobs that you have planned for the future. This war has provided a tough proving ground for excavators and material handling equipment. It has brought to the forefront the ruggedness and dependability of LIMA-MADE equipment, built to perform under extreme pressure. As their wartime task continues, LIMA engineers continue to make improvements in design and construction that you may have, after Victory, the best shovels, cranes and draglines built.

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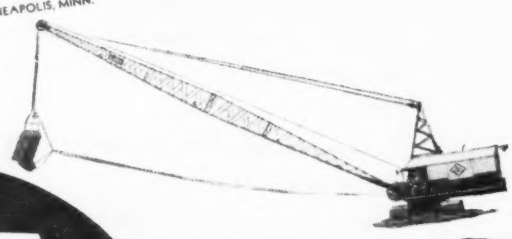

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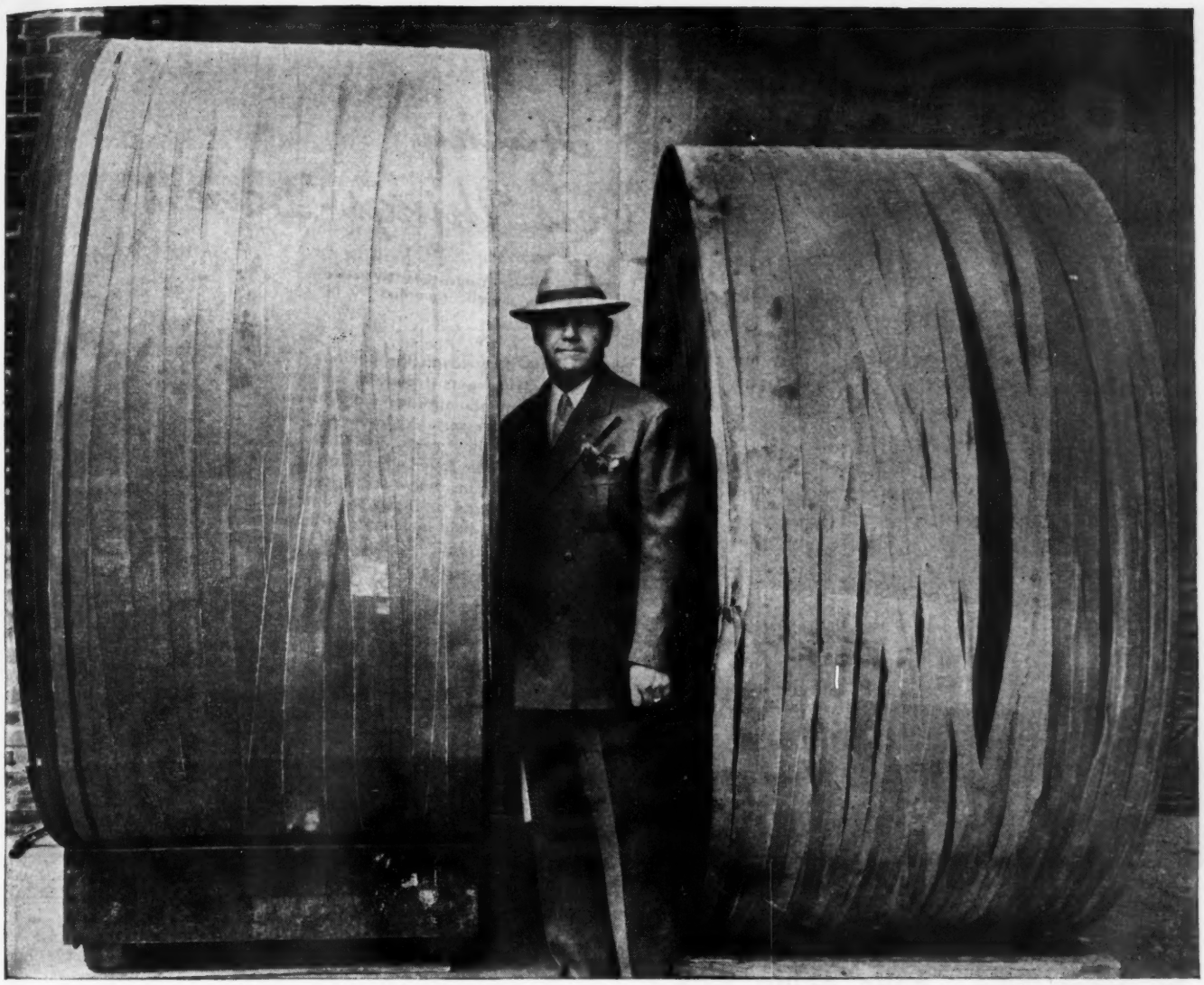

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Thousands of feet of rubber belting are required by the demands of War. Belts of this size are being constantly manufactured at Quaker's busy plant.

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Quaker is maintaining Belt Production at peak figures. When the requirements of War needs Belts, Quaker gives that order the right of way. You would not want it otherwise. Events happening on the various battle fronts make it look brighter to that day when production can be devoted 100% to civilian requirements.

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The Jenny Is A "Husky" That Gets Things Done!

Simplex Jenny Center-Hole Hydraulic Puller. Five models; capacities 30 to 100-tons.

No matter how tough the pulling, pushing or lifting job, the Simplex Jenny gets it done in minutes instead of hours. "Impossible" maintenance tasks around mines are all in the day's work for this powerful hydraulic unit, which is ruggedly built of heat-treated alloy steels. The Center-Hole makes the Jenny a great manpower saver when pulling bushings, cylinder liners, pistons, wrist pins, valve seats, keys, wheels, sprockets, gears, etc. Alloy rod can be tack-welded to parts to be pulled, passed through center-hole in Jenny and bolted or fastened above the ram. Can be readily set up as a portable press. Send for Bulletin No. 43-J.

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LEVER - SCREW - HYDRAULIC
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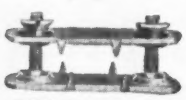
Keep your conveyor belts going with FLEXCO HD BELT FASTENERS

• **FLEXCO H D RIP PLATES** are used in repairing rips and patching conveyor belts. The wide space between outer bolts gives the fastener a long grip on the edges of the rip, while the center bolt prevents the fasteners from bulging.

• Avoid shutdowns and lengthen the life of your conveyor belts and bucket elevator belts by using Flexco HD belt fasteners and rip plates. Thousands of companies have stepped up the performance of conveyor lines and cut costs by using Flexco methods.



• **FLEXCO H D BELT FASTENERS** make a strong, tight butt joint with long life. Recessed plates embed in belt, compress belt ends and prevent ply separation. Six sizes in steel and alloys.

Bulletin F-100 shows exactly how to make tight butt joints in conveyor belts with Flexco HD Belt Fasteners. Also illustrates step by step the latest practice in repairing rips and putting in patches.

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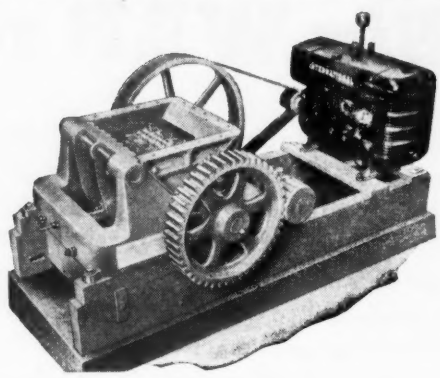

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The Lincoln Powerluber will save manpower and speed up the lubrication service in your plant. Ask your wholesaler or write us for complete information.

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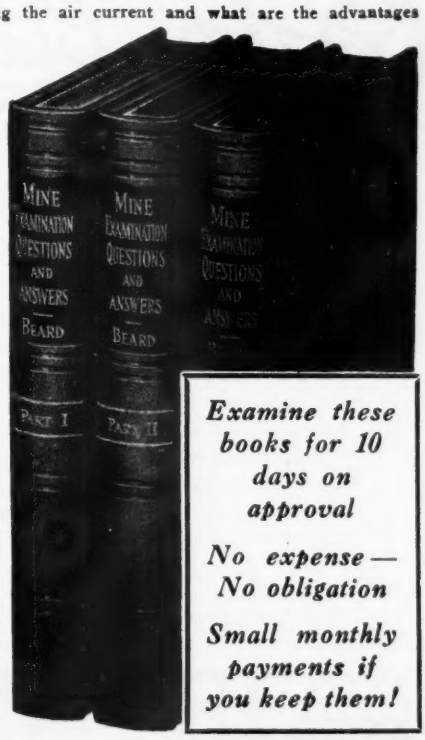

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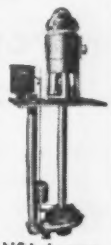
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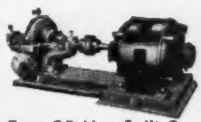
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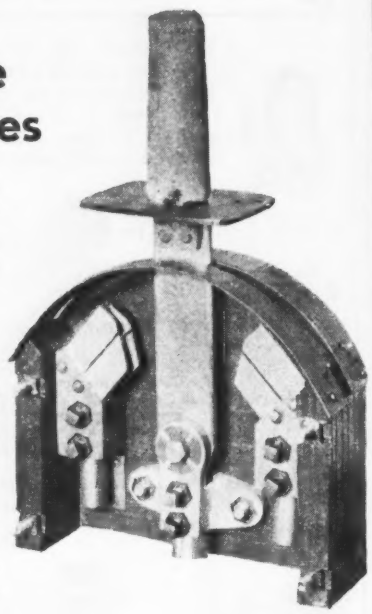
A RUGGED Switch For Mine Locomotives



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Cover is removed to show the rugged construction. Note the large capacity of blade and contacts. Terminals are removable.

For haulage locomotives, with two trolley poles, we make a similar switch of larger capacity.

List Price....$12.50

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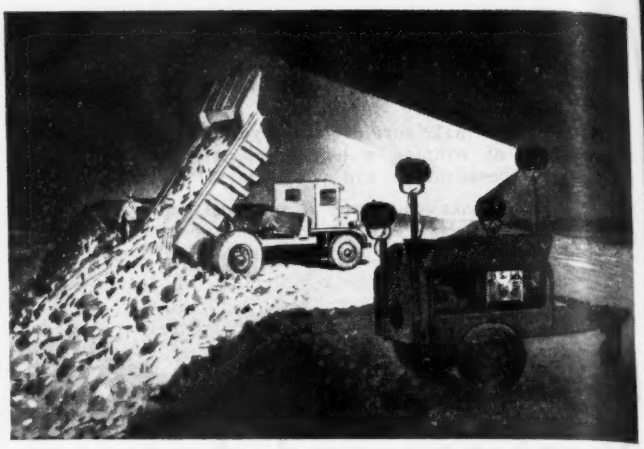

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320,000 CANDLE POWER OF LIGHT

Self-generating, portable, the Nite-Hawk is ideal for lighting up waste dumps and other night operations. Its four 1,000 watt wide-angle floodlights may be adjusted up or down and in all directions — removable, too, for work away from unit. Also provides power for operating electric hand tools and emergency operation of pumps, ventilating equipment, etc. Write for Bulletin NH5E.

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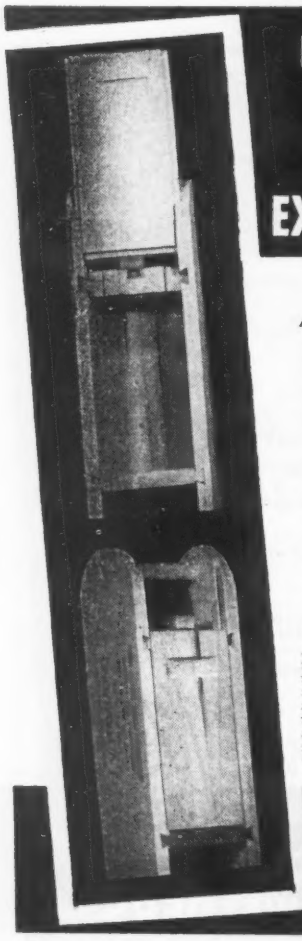

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Approved by Penna. Dept. of Mines

Boxes are constructed entirely of wood, having no metal parts. They are of tongue-grooved and dovetailed construction, having handle for carrying, and are equipped with automatic lock using rubber bands for a spring.

NOTE: There are NO metal parts . . . conforming to regulations of the Penna. Dept. of Mines.

Important: Prompt deliveries of these Hammond products: safety explosive boxes — wood tamping poles — shovel handles — rope rollers — trolley poles.

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Mechanical Loading of Coal Underground

By IVAN A. GIVEN
EDITOR, *Coal Age*

397 pages, 6 x 9, 222 illustrations, $4.00

THIS practical manual thoroughly discusses the various types of equipment used in slope sinking, entry-driving, and development work, and in production of coal from the usual or regular working sections—details the methods suited to or used with the various types of equipment and under various seam thicknesses and natural conditions—tells how machines are best installed, where they can fill in for other types of equipment, what to do to get biggest production from equipment.

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- —every possible way in which equipment can be used
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- —what factors to consider in purchasing mechanical-loading equipment
- —when a small investment in simple attachments saves the purchase of an entire new machine
- —installation considerations for all equipment
- —methods for increasing mining extraction etc., etc.

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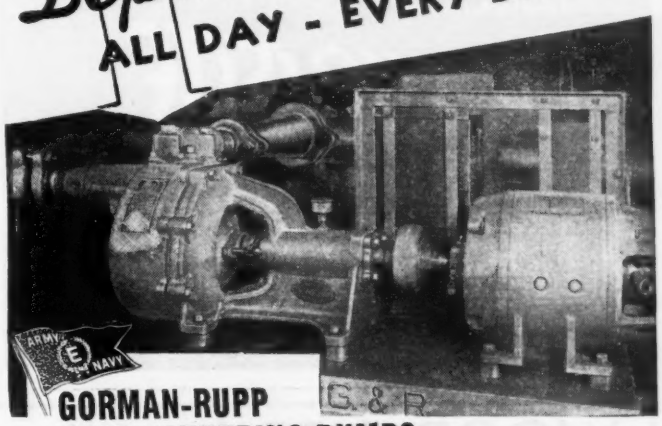

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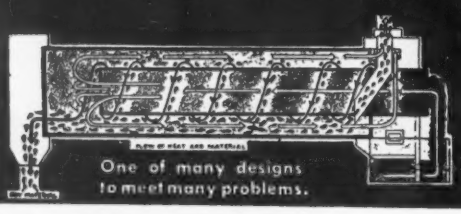

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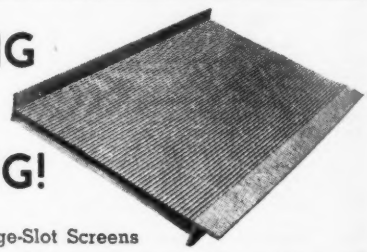

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42"	5	1/8"	1/16"	20"	4	1/8"	1/32"
36"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	6	1/8"	1/16"	16"	4	1/8"	1/32"
30"	5	1/8"	1/16"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"
24"	4	1/8"	1/32"				

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14"	6	8"	6	4"	5
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VALVES AND FITTINGS
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PROMPT SHIPMENT FROM OUR WAREHOUSE

MINING MACHINES

5—12 DA 50 HP 250 v. Goodman Shortwall
35 B Jeffrey 250 v. 6' cutter
12 A Goodman 250 v. 36" Ga. 35 HP

STORAGE BATTERY LOCOMOTIVES

2—6 Ton G.E. Permissible Locomotives 36/44" Ga. O.S. armorplate frame. Inside steel tired wheels. 2-HM 825 Ball Bearing Motors. Type LSBE Class 2C6 From C9. 13½' long, 50" high, 69" wide and 44" Wheel base
Each of the above units equipped with Edison Battery 80 cell A-10—one new in 1940, the other in 1939.

2—5 to 5½ Ton Type D Ironton, 36 or 42" Ga. Low Type, with Exide Battery.
1—5 Ton Atlas 40" or 44" Ga. with 2 Ball Bearing Motors. Battery box on top of locomotive.
4 Ton 36" Ga. Atlas, with Exide Battery.
4 Ton 36" G.E. (2 motors), with Exide Battery.

(Haulage)

13 Ton Westgh. 250 V. 36" or 40" Ga.
13 Ton Westgh. 500 v. 40" Ga.
10 Ton Jeffrey 500 v. 36/42" Ga.
6 Ton Baldwin West. 250 v. 36/42" Ga. #48747 904 Motors outside bar steel frame, inside steel tired wheels.
2—6 Ton G.E. 500 v. 42/44" Ga.
2—6 Ton G.E. 250 v. 42/44" Ga.
1—5 Ton West. 250 V. 36 or 42" Ga. with Electric Gathering Reels. Bar steel frame.

SCREENS

2—4' x 5' single deck Tyler Hummer Screens Type 37 equipped with V-16 Vibrators No. 2860 and 2867 designed for 110 v. AC 15 cy.

MG SETS 3 ph., 60 cy. (Syn.)

150 KW G.E. 250 v.—2200/3/60 900 RPM
100 KW Ridg—250 v. DC—2200/3/60 AC 1200 RPM.
100 KW West., 125 v. DC—2200/3/60 AC 1200 RPM
100 KW G.E. 275 v.—220/440/3/60 600 RPM Belted sq. cg.
100 KW G.E. 275 v.—2200/3/60 900 RPM.

ENGINE GENERATOR & TURBINE SETS

100 KW 250 v. DC Westgh.—Skinner Engine.
57.5 KVA Allis Chalmers Gen. 220/3/60—Kerr Turbine.
50 KW West. 125 v. DC—Skinner Engine.

TRANSFORMERS

Qu.	KVA	Pri. V.	Sec. V
31	7½	"	"
28	10	"	"
3	37½	22000	2200
1	50	2400	230/115

CAPACITORS

180 KVA 2200/3/60 Type OH1 3 ph. 60 cy.

DC GENERATORS

150 KW West. Type S, 250 v. 450 RPM.
2—100 KW G.E. 250 v. 850 RPM Type CL
75 KW G.E. DLC 125 v. 700 RPM.
50 KW West. 250 v. 900 RPM.

SLIP RING & SQ. CG. MOTORS

HP	Make	Speed	Wdg.	Type
500	G.E.	450	S.R.	MT 412
200	G.E.	250	S.R.	MT 412
200	G.E.	600	S.R.	I-M
150/75	West.	580/290	S.R.	CW
150	West.	375	S.R.	CW
150(2)	West.	600	S.C.	CCL
125	Al. Ch.	435	S.R.	
100	G.E.	500	S.R.	MI-25 cy.
100	Al. Ch.	575	S.R.	
100	G.E.	1200	S.C.	
100	West.	580	S.C.	CS
75	West.	580	S.R.	CW
75	West.	290	S.R.	CW
50	G.E.	900	S.R.	IM

Other sizes down to 1 HP

DC MOTORS—230 VOLTS

HP	Make	Speed	Wdg.	Type
175	G.E.	475	ser.	MD 109½
100 (3)	G.E.	700	cp. wd.	CI. 90
130	G.E.	550	ser.	CO 1812 A
100	G.E.	480	ser.	MD 108
60	G.E.	600	ser.	CO 2507
50	West.	850	cp. wd.	SK
25	West.	600	cp. wd.	SK 130
25	Reliance	850	cp. wd.	185 T

SYNCHRONOUS MOTORS

HP	Make	Voltage	Speed	Type
200	West.	2200	900	
150	G.E.	2200	900	ATI

Each of the above has a dir. con. exciter.

MOORHEAD-REITMEYER CO., INC. **Pittsburgh 19, Pennsylvania**

ROTARY CONVERTERS

500 KW AL-CH SYN 275 V. 6 Ph., 60 Cy., 1200 RPM. Pedestal Type, 2300/4000 V., Transformers.
500 KW WEST. SYN 275 V. 6 Ph., 60 Cy., 1200 RPM. Pedestal Type, 2300/4000 V., Transformers.
300 KW G.E. SYN 575 V. HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.
150 KW WEST. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM. Bracket Type, 2300/4000 V. Transformers.

MOTOR GENERATORS

500 KW WEST. SYN. 275 V. 2300 V., 3 Ph., 60 Cy., 900 RPM. Manual Switchgear.
200 KW G.E. IND. 600 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM. Manual Switchgear.
200 KW R.W. SYN., 275 V. 2300/4000 V., 3 Ph., 60 Cy., 900 RPM. 80% P.F. Manual Switchgear.

LOCOMOTIVES

13-T WESTGHE., 250 V. 908-C Mts., 36" Ga.
13-T GOODMAN, 250 V., 36-A Mts., 36"-42" Ga.
10-T WESTGHE., 250 V., 907-C Mts., 36"-44" Ga.
10-T WESTGHE., 500 V., 907-C Mts., 36"-44" Ga.
8-T WESTGHE., 250 V., 906-C Mts., 36"-44" Ga.
8-T WESTGHE., 500 V., 906-C Mts., 36"-44" Ga.
8-T GEN. ELEC., 250 V., 839 Mts., 36"-48" Ga.
6-T WESTGHE., 250 V., 904-C Mts., 36"-48" Ga.
6-T GEN. ELEC., 250 V., 823-A Mts., 36"-44" Ga.

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P & H Model 700 shovel and crane 1½ yd. capacity
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P & H 650 Shovel and Crane
Buc. Erie GA-2 Shovel, gas
General ½ yd. Diesel Crane
P & H 203A Truck Crane, 8 tons
Lorain 45 Crane-Shovel, ¾ yd.
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2—Conway Muckers "50", 36" ga. rebuilt
Buc. Erie 50B Steam Shovel 2 yds.
Buc-Erie B2 shovel and crane 1 yd. capacity
Koehring 301, ¾ yd. Shovel & Crane
Buc. Erie Steam Dragline, 6-8 yds. 175' bm.
Lorain 75B 1½ yd. shovel-crane
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Allis Chalmers HD10 Tractor with bulldozer
Allis Chalmers, "K" Tractor with bulldozer
Int. T35 Tractor with Angledozer
Jaw Crushers: 12x26, 13x30, 14x28, 16x32
Gyratory Crusher, Superior-McCully 30"
Gyratory Crusher, Traylor Type T, 12"
Mundy 35 H.P. double drum gas Hoist
National 100 H.P. dbl. drum Dragline Hoist, elec.
Baldwin 78 ton Side Tank Locomotive
American 45 ton Saddle Tank Switcher
Vulcan 30 ton Steam, std. gauge Saddle Tank loco.
Vulcan 25 ton Steam Loco. std. ga. side tank
Whitcomb 14 ton 36" gauge Diesel Loco.
Vulcan 6 ton, 36" gauge, gas Locomotive
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Haiss Model 16 wagon loader Cat. type
Haiss 30' scraper conveyor wagon loader
Trucks: Mack, Sterling, G.M.C. up to 12 yds.
Pumps—Gas, Electric, Steam, large stock
Air compressors from 300 to 2000 cu. ft.
Bucket elevator, belt, 22", buckets, 35'
Haiss ¾ yd. Clam, rehandling Bucket
Erie ¾ yd. Clam, rehandling Bucket
Blaw-Knox ⅞ yd. Clam, digging Bucket
Hayward ⅞ yd. Clam, digging Bucket
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Cat. RD7 tractor with bulldozer
Cat. D7 tractor with bulldozer
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ARMATURE REWOUND—ALL REBUILT
COMPLETE PANEL CONTROL
JOHN D. CRAWBUCK CO. PGH. (22) PA.

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Above machines operate on direct current
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2—Sullivan CR 2 shortwall machines 250 volts D.C.
1—Sullivan CE 9 longwall machine 440 volts A.C.
3—Jeffrey 24 B longwall machines 250 volts D.C.
2—Jeffrey 35 L shortwalls 440 volts A.C.

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OTTUMWA SINGLE DRUM HOIST
60 H.P. Motor.
MOTOR GENERATOR SET
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HIGH SPEED VENTILATING FAN
20,000 ft. per minute capacity.

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1—35 kw. 1150 rpm. 250 v. DC Gen. dir. conn. to 50 HP 240/480 v. 3 ph. 60 cy. 1200 rpm. Cr. Wh. Syn. Motor.
1—100 kw. 250/275 v. DC G.E. Gen. dir. driven thru coupling by 1—150 HP 2200 v. 900 rpm. G.E. Syn. Motor.
1—200 kw. West. 600 v. DC 900 rpm. Gen. direct driven through common shaft by 1—290 HP 440 v. 3 ph. 60 cy. West. Syn. Motor.

ROTARY CONVERTERS

3—150 kw. West. 3 ph. 60 cy. 275 v. 1200 rpm. Rotary Converters comp. with transformers, switchboard.
3—300 kw. West. 3 ph. 60 cy. 600 v. 1200 rpm. Rotary Converters comp. with transformers, switchboard.

DIESEL ENGINE GENERATOR SET

1—150 kw. 250 v. 200 rpm. cp. wd. Cr. Wh. Gen. dir. conn. to 260 HP 200 rpm. 2 cyl. Buckeye Diesel Engine.

MINING MACHINES—250 v. DC

1—CE-7 Sullivan 36" ga.
1—Armature for CE-7 Sullivan 250 v. DC.

MINE LOCOMOTIVES

3—5 ton Goodman 30 B. 250 v. 36" ga.
1—5 ton Goodman 2600R Gathering Locomotive, 250 v. DC 42 or 44" ga. with cable reel.
2—7 ton Goodman 32-0-4-T 250 v. 36" ga.
1—10 ton West. 500 v. 40" ga.
1—10 ton Goodman Locomotive, 250 v. 42" ga. cast iron frame, inside wheels.
1—12 ton Westinghouse 42" ga. 250 v. Locomotive, cast iron frame, two motor type, single end control.

CENTRIFUGAL PUMPS

1—1000 GPM Cameron bronze, 100' hd.
2—American Piston Pumps, intake 5½", discharge 4½", size 8x12.

SLIPRING MOTORS—3 ph. 60 cy.

HP	Make	Type	Volts	RPM
300	G.E.	I	440	900
260	Burke	EMV-65	440	600
150	West.	CW	220/440	490
150/75	West.	CW	220/440/2200	580/290
100	West.	CW	220/440	685
75	G.E	I-M	440	1200
75	West.	CW	220/440/2200	580/290
50	Chaud.		220/440	1800
50	Allis Chal.		220	490
20	Westg.	CW	220	1735
15	Westg.	CW	220	870

230 V. DC Motors

HP	Make	RPM	Type
¾	Cr. Wh.	850	EI
1	Louis Allis	1150	INA
1½	Westg.	2200	SK
1½	Westg.	1000	CD
1½	Westg.	900	SK
1½	Robbins Myers	1750	
2	Thompson	1100	
2	Northern	1000	
4	Westg.	1180	
4	Cr. Wh.	1170	CM
5	Cr. Wh.	960	CCM
5	Cr. Wh.	980	CM
5	Imperial	540	SK
5	Westg.	850	
5	Westg.	1600	RC
7½	Cr. Wh.	875	
7½	Cr. Wh.	875	
7½	Cr. Wh.	940	CCM
10	West	1325	S
10	Cr Wh.	875	
10	Cr. Wh.	825	CM
10	Cr. Wh.	675	CCM
15	G.E.	850	RC
15½	West.	965	S
35	G.E.	900	DLC

TRANSFORMERS—1 ph. 60 cy.

No.	Kva	Pri.	Sec.	Make
1	2	6600	110/220	G.E.
3	5	2300	220/440	G.E.
1	5	550	110	Pgh.
1	5	2200	110/220	West.
84	7½	2200	220/110	G.E.
32	7½	2200	220/110	West.
12	10	2200	220/110	West.
13	10	2200	220/110	G.E.
2	15	400/30000/50000		American
1	25	2200	220/110	G.E.
6	35	220	110	West.
3	37½	2200	440/220	West.
3	50	6600	575/440/220	G.E.
2	50	6600	550/440	Pgh.
2	50	4600	550/440	Al. Ch.
6	73	2200/4000	220/110	West.
6	73	440	205	West.
1	75	2200	220	Burke
6	75	2200	220/440	West.
3	150	2400	220/440	AllisChal.

AUTOMATIC RECLOSING CIRCUIT BREAKERS

1—300 Amp. 275 volts, type RBI, serial No. 6193.
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1—600 Amp. Class I, type AHD, 275 v. Ser. No. 8051.

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16. Refrigerator, 36-Ft., 30-Ton
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29. Box, 36-Ft., 40-Ton
9. Dump Koppel Automatic, 30-Yd.; with aprons. 50-Ton
25. Dump, Western Automatic, 30-Yd., 50-Ton; with aprons.
10. Magor, Automatic, 30-Yd., 50-Ton; lift doors.
10. Western Automatic, 30-Yd., 50-Ton; lift doors.
4. Dump, Western, 20-Yd., 40 & 50-Ton
1. Dump, Koppel, Drop-Door; 20-Yd., 40-Ton
18. Dump, K & J Automatic, 16-Yd., 40-Ton
20. Flat, 40-Ft., 40 and 50-Ton
35. Gondola, Composite, 36-Ft. & 40-Ft., 40 & 50-Ton
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1—8 Ton Jeffrey steel frame, 250 v.
1—8 Ton Goodman, steel frame, 250 v., type 3104-T, 42" track gauge.
1—6 Ton West, bar steel frame with 904-C, 250 v., motors.
1—5 Ton GE ready to operate, 42" gauge.
2—5 Ton Goodman, 250 v., 36" gauge.
1—4 Ton Jeffrey MH 96, 250 v.

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1—124 EJ Goodman, 50 HP, 250 v., permissible track mounted slabbing machine.
3—112 CA Goodman, 250 v.
1—12 DA Goodman, 50 HP, 250 v., D. C.
1—12G3 Goodman, shortwall, 3/60/220 v., A.C.
1—12 AB Goodman shortwall, 250 v., D.C.
1—36 B Jeffrey, 250 v., longwall.

MG SETS AND ROTARIES

1—100 KW Rotary Converter, 275 v., D.C.
1—D—13000 Caterpillar Diesel Engine Coupled to 100 KW 275 v., D.C. Generator.
1—165 HP G.E. Syn, 2200 v., 900 rpm motor, 100 KW, 250 v., D.C.
1—300 KW G.E. MG set, 275 v., 3 ph, 60 cy, 2300 v., 1200 rpm
1—150 KW G.E. type HCC form P, 275 v., Rotary Converter complete.

Send us a list of any equipment you may have for sale.

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2½ ton Whitcomb 24 ga. New Batteries
2—4 ton G.E. 30 in. ga.
3—5 ton Mancha 30 in. ga.
4—5 ton G.E. 36 in. ga.
3—7 ton Goodman 36 ga. Battery & Trolley
8—6 ton Baldwin Westgh. 42 ga. & 36 ga.
TRACK SCALE:
150 Ton Buffalo 56 ft. R.R. Track Scale
TROLLEY LOCOMOTIVES:
2½ ton Westinghouse 24 ga.
4—6 ton & 3—5 ton Goodman 36 ga.
3—6 ton Goodman 30 ga.
4—6 ton Goodman 42 ga.
5—6 ton Westinghouse 42 ga.
2—8 ton Goodman 36 ga.
10 ton Goodman 42 ga. & 13 ton Jeffrey
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2 yd. P. &. H. Model 780 75' Boom Diesel Dragline
2—2¾ yd. 48B Diesel Shovel—Draglines
2 yd. Page 70' Boom Diesel Dragline
1¼ yd. Marion 450 Elec. Shovel
2—120B—4 yd. Elec. Shovel—Dragline
25 ton Browning 50' Boom Loco. Crane
MINE LOADERS:
H23 Sullivan Tunnel Loader
3—5 BU & 7 BU & 12 BU 36 or 42 ga. Joy
7 Conway 20A, 30A, 50A, 60 & 75 Muckers
5—Gardner Denver & Elmco Shovels
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5'x60' Traylor Rotary Dryer
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WE WILL FIGURE WITH YOU ON YOUR SURPLUS

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24"x18' Lodge & Shipley, M.D.
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6' American Triple Purpose, M.D.
6' Cincinnati Bickford Radial M.D.
7' Cincinnati Bickford Radial M.D.

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218 E. Second St., Cincinnati, Ohio

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